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RHODESIA

REPORT OF THE SECRETARY FOR AGRICULTURE

for the period

1st October, 1966, to 30th September, 1967

Presented to Parliament of Rhodesia

1968

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REPORT OF THE SECRETARY FOR AGRICULTURE

(which includes the Economics and Marketing Branch, Co-operatives and Loans Branch, the Departments of Research and Specialist Services, Conservation and Extension and Veterinary Services).

FOR THE PERIOD 1st OCTOBER, 1966, TO 30th SEPTEMBER, 1967.

CONTENTS

	Page No.
Report of the Secretary for Agriculture	1
Outlook	9
Report of the Economics and Markets Branch	12
Report of the Co-operatives and Loans Branch	15
Introduction	15
Progress	15
Details of Co-operative Societies	17
Details of Co-operative Companies	18
Loans	18
Staff and Establishment	19
General	19
Annexures "A" to "E"	21–22
Report of the Department of Research and Specialist Services	23
Animal Husbandry	24
Dairy	25
Poultry	26
Pasture Research	27
Horticulture	28
Botany	29
Plant Protection	30
Chemistry and Soil Science	32
Biometry	33
Salisbury Research Station	33
Chipinga Experiment Station	35
Gatooma Research Station	36
Grasslands Research Station	38
Henderson Research Station	40
Matopos Research Station	41
Makoholi Experiment Station	42
Rhodes Inyanga Experiment Station	43
Lowveld Research Stations	44
Gwebi Agricultural College	45
Chibero Agricultural College	46
Report of the Department of Conservation and Extension	48
Introduction	48
Organization and Staff	48
Visits to Other Countries	50
Services	50
Engineering	53
Training	53
Publications and Publicity	54
Youth Extension	54
Training of Women	55
Extension Research	55
Land Tenure Advisory Service	55
General Agricultural and Livestock	55
Conservation	59
Irrigation	61
Conclusion	61
Appendices I—X	62–73
Report of the Department of Veterinary Services	74
Staff	74
Livestock Economy	75
Disease Factors	77
Meat Inspection	85

Report of the Secretary for Agriculture

for the period 1st October, 1966, to 30th September, 1967

In a report of this nature one would wish to put the full picture of the progress of agriculture in the past year. However, for reasons now well known many of the achievements must by necessity be omitted or at best hinted at. Following the successes achieved under the imposition of economic sanctions it was expected that greater pressures would be applied by the United Kingdom and other countries. One of the actions was the additional imposition of mandatory sanctions by the United Nations against specific export commodities included in which were a number of agricultural commodities. In spite of such trade restrictions, the versatility of the Rhodesian farmer and marketing organizations, together with a satisfactory climatic season, ensured that the agricultural sector continued to play a prominent part in the over-all welfare of the country.

Climatic Conditions

For a number of years the philosophy of farming that "next year will be better" was being thwarted to a large extent by the occurrence of unfavourable weather conditions in so far as the agricultural sector was concerned. The position was reversed this year and farmers throughout the country enjoyed what can be described as a good season. Rainfall over most of the country was well up to normal levels although certain areas experienced rainfall well above average and also a season where rains carried on well into the harvesting season.

By and large crop production showed an outturn well beyond expectation especially in view of the greater diversification of cropping which occurred. It appears new producers of such crops as cotton, sorghum, groundnuts and maize quickly fell into the methods employed by traditional producers. Traditional areas for maize and cotton, once easily designated, have now become far more widespread in the North and the latter crop is now only restricted by altitude.

Within the cattle areas of the country seasonal conditions were a far cry from those previously experienced. Drought relief measures were not necessary and it was possible for a return movement of cattle into those areas denuded in the previous years. However, as time passed it became apparent that a large number of cattle moved into Mashonaland under the emergency measures during 1965-66, and indeed during the previous year, were finding a permanent home in the north of the country. In view of this position the cattle industry is now becoming far more capable of withstanding adverse seasonal conditions and there is not the same necessity to move more than average numbers of cattle to abattoirs. Again, with the improved feeding conditions found in the northern areas the greater and earlier production of beef off the land is becoming a reality.

It will be recalled that one of the emergency drought relief measures introduced during the previous year was the additional payment made to producers in respect of cattle not slaughtered. Whilst the basic purchase price was paid to the producer the additional amounts which ranged from £3 10s. to £5 10s. per head, were credited to an account in the producer's name. These amounts would be made available to the producer for restocking when conditions returned to normal. However, in certain cases this money was made available for farm improvements other than restocking, such as boreholes, dip tanks, fencing, etc. Time has shown that many farmers in the drought-prone areas took advantage of this latter facility and today many of these farms are far better equipped to withstand the vagaries of the weather. In this respect the payment of a "bonus" has certainly proved its worth and the total amount made available, whilst appearing large, can be regarded as insignificant in the context of the future prosperity which will result.

African Sector

Agricultural production within African areas also showed a marked improvement and whilst there are still a number of problems to be overcome, especially in the fields of population growth, traditions, land tenure and education, the movement of this sector into the cash economy, through improved cultural practices, is beginning to bear fruit.

Valid statistics on such progress are lacking but those that are available show that with education, including extension advice, crop yields and livestock production can be enhanced considerably. In the past season it is estimated that the

Purchase Areas produced about 600,000 bags of maize, almost 2 million lb. of cotton, over 100,000 bags of shelled groundnuts, 50,000 bags of rapoko and 35,000 bags of munga. In addition over 10,000 head of cattle were sold at an average of £20 10s. per head. Although these production figures are impressive, there is still room for improvement in yields.

It is for this reason that stress is being laid on the provision of extension services, co-operatives and the provision of credit, as greater output will lead to higher cash incomes which in turn gives access to the products of other sectors of the economy. Although only a forecast, it is estimated that the value of African agricultural products sales in 1967 will approach £8 million. Whilst the Department of Conservation and Extension through extension services and the Co-operatives Branch through provision of credit and marketing facilities have played a large part in this welcome breakthrough in production, mention must be made of the high level of co-operation received from many of the Chiefs. At times in the face of difficulties they have been foremost in assisting officials in the spread of knowledge knowing it was to the benefit of their people as a whole.

Farming Under Sanctions

For close on two years farming has been undertaken under conditions quite foreign to those normally encountered by a country with an agricultural base. Agricultural exports often found themselves up against trade barriers of both developed and developing countries but the imposition of mandatory sanctions created barriers thought to be insurmountable by many. To their dismay this has not been the case.

Whilst the main impact has continued to be against tobacco, followed by beef, the efforts of the Tobacco Corporation and the Cold Storage Commission together with many other organizations, have maintained a trading pattern of some magnitude.

As mentioned earlier the farmer has also accepted his new role and there is no doubt that the necessary changes introduced will bode well for the future in giving the industry a broader and sounder base.

Following the introduction of a control scheme for tobacco for 1966-67, the position for 1967-68 was reviewed in the light of prevailing circumstances during mid-1967. As opposed to a flue-cured tobacco crop of 200 million lb. for 1966-67, a target of 132 million lb. was announced for 1967-68, at an average price of 28d. per lb. To assist tobacco growers in meeting this target without too much effect on their farming operations a further three measures were introduced. These were briefly:

(a) a payment of 6d. per lb. to the grower for that proportion of his tobacco quota surrendered. The foreclose of quotas was limited to a maximum of 68 million lb. During the period in which it is necessary to retain a marketing control a grower would be permitted to re-enter the industry after not having produced for one year by refunding 4d. of the 6d. After two years the payment would be 2d. per lb. and after 3 years no repayment. Re-entrants to the industry would be subject to any quota scheme then operative;

(b) the allocation of funds to the five Regional Committees of the Farm Irrigation Fund which embrace the tobacco producing areas was doubled. The extra allowance of money was intended primarily for use by the tobacco producer who may wish to change from tobacco to other forms of production;

(c) the establishment of a diversification loan fund of £1.5 million. Low interest rate loans were available from this fund and no redemption was required until after the third year and interest accruing over this period was capitalized. Priority for loans was given to those farmers who suspended production of flue-cured tobacco.

In addition recommendations were made on the types of tobacco producers should aim for in order to satisfy demands of existing markets.

At the same time as the announcement of the target figure for flue-cured tobacco for 1967-68, target figures for Burley tobacco and Oriental tobacco of the Sansun variety were given of 5 million lb. at an average producer price of 26d. per lb. and 1.5 million lb. at 26d. per lb. respectively.

A further feature now becoming apparent and further emphasizing the versatility of Rhodesian farmers, is the manner in which they have accepted the principle of "make do and mend".

In the face of limitations on the availability of the tools of mechanized farming, adaptability has come to the fore. This in itself has had an effect on production costs. Recent information on costs shows that in the face of rising input costs and indeed lower unit returns, unit costs have fallen to meet these conditions. Again the necessary continuation of fuel rationing and higher fuel costs has not hindered the expansion of acreage under production. Indeed one has thoughts that under sanctions farmers have come to realize more forcibly the necessity of utilizing available resources to best advantage and avoid waste which one assumes must have occurred in the past. As evidence for these comments on input costs and utilization of resources one can quote from the costs of an identical sample of 71 tobacco producers over the years 1963-64 to 1965-66. Tractor fuels and oils per acre showed the following trend, £3 11s. 2d.; £3 13s. 9d.; £3 4s. 1d., whilst total costs per acre were £114 10s. 8d.; £114 2s. 3d. and £105 12s. 1d. Yields per acre were 1,412 lb.; 1,272 lb. and 1,406 lb. respectively.

Diversification

Certain measures introduced to foster the movement towards a broader based agricultural industry were mentioned last year and some of the additional measures introduced this year were touched upon in preceding sections of this report. However, this policy, which is of such importance to the agricultural sector, merits more mention of the actions taken to implement it.

(a) *Input Subsidies*—in order to assist farming in general it was announced in November, 1966, that a subsidy would be payable to farmers on their purchases of both nitrogenous fertilizers and diesel fuel purchased in bulk over the period 1st April, 1966, to the 28th February, 1967. The subsidies were therefore applicable to the 1966 winter crops and the 1966-67 summer crops. The rates of subsidy amounted to about £8 10s. per ton on the price of nitrogen and 3d. per gallon on diesel fuel. In addition the fertilizer companies announced retrospective price decreases on nitrogenous fertilizers commensurate with import cost levels.

The particular forms of the assistance were selected as it was considered they would give help over a much wider field than others. However, there are disadvantages to such a method of assistance in that such subsidies need not necessarily direct aid into the hands of those who need finance. Again under such a system there is no guarantee that such subsidized inputs would be utilized to best advantage. In view of more positive forms of assistance made available the payment of subsidies on input costs has not been continued.

(b) *Farm Irrigation Fund* — mention of the main details of this scheme were made in the report for 1965-66. In addition a further £250,000 was made available this year for five areas in Mashonaland and Manicaland primarily to provide funds for those farmers who have given up tobacco production and went in for other agricultural activities.

Since the inception of the scheme in June, 1966, some 300 farmers have benefited from the scheme to the tune of nearly £800,000. Investment of this amount in water conservation and utilization has meant the additional availability of over 20,000 acres of irrigable land over the country. This can be regarded as only the start of a move to bring many thousands more acres, hitherto showing a very low level of production, up to a productivity level surpassing that found in the better farming areas under normal rainfall conditions. The advantages of this type of development, whilst already apparent, will be more readily seen in the longer term. The detrimental effects of drought conditions will be eased but what is just as important to a developing country is the fact that production per acre will increase. Such production will not only be necessary to support an increasing population and the demands of industry but will enable increasing quantities of primary agricultural products to find their way into export markets at competitive prices.

(c) *Agricultural Diversification Scheme*—whilst the above-mentioned forms of assistance were not primarily directed at diversification their advantages in this direction are apparent. In the case of this scheme agricultural diversification into other forms of production than tobacco was the primary objective. In order to be eligible for a loan under this scheme, an applicant had to be a registered flue-cured tobacco grower for the 1967-68 season—issued with a marketing quota for that year. Orders of priority were established based on whether the farmer was going completely out of production, producers whose tobacco production was severely curtailed and other tobacco producers.

Government made available £1.5 million for the provision of low-interest loans and the operation of the scheme was initially conducted through District Committees in each of the 24 Rhodesia Tobacco Association Districts. The main function of these committees was to assess each individual application ensuring that the proposed diversification programme fell within acceptable criteria of diversification based on the capabilities of the farmer and the farm. Such applications were then forwarded to a Central Committee consisting of officials of the Ministry, Rhodesian Tobacco Association and the Rhodesia National Farmers' Union, for final approval. Once this was given loans were processed with maximum speed by the Ministry and in this regard the close co-operation received from the staff of the Rhodesian Tobacco Association and the Land Bank deserves mention.

From the announcement of the scheme in mid-June, 1967, to the end of September, 1967, some 824 applications had been received of which 626 had been approved involving some £980,000. A further 186 applications were receiving attention, involving a further £246,000, whilst 12 applications had been withdrawn.

A comparison of the farming programmes submitted by the applicants for the years 1966-67 and 1967-68 shows a reduction in tobacco acreage of some 26,000 acres, whilst acreage of other crops, an increase of some 62,000 acres. Cattle and other livestock showed an expansion of approximately 84,000 head. Diversification trends were therefore apparent and doubtless due in no small measure to the facilities provided by this scheme.

(d) *Incentive Prices* — for many years the appearance in agricultural import statistics of the level of wheat imports gave rise to promotional ventures to make the country less dependent on outside suppliers. However, little success was attained due in no small measure to the anticipated low level of return compared with other forms of production. With the advent of trading difficulties greater emphasis was directed towards fulfilling a far greater proportion of our wheat requirements from local sources. To this end a committee of officials investigated the possibility of paying a wheat incentive price and following consideration of the recommendations made, a price of 67s. 6d. per 200 lb. bag was announced for wheat to be effective as for the 1967 winter and summer crops. This price was later extended to cover wheat crops up to and including the 1969 winter wheat crop.

Under these pricing conditions the development of irrigation facilities, especially in the low-veld, for the production of winter wheat, was given a boost. Large estate production of wheat, pioneered with success by the Sabi-Limpopo Authority in 1966, showed a considerable expansion in 1967, and further expansion is predicted. In addition wheat was introduced as an additional crop by one of the large sugar estates and many farmers in the highveld. At present the prospects for this crop are good and credit is due to all those involved in this successful venture.

In addition to wheat the possibility of expanding production of other crops also came under consideration and in this respect incentive prices were announced for both groundnuts and soya beans. In the case of the former, prices applicable to the 1967-68 crop were 110s. per 180 lb. bag, for grade A nuts and 85s. per bag for B grade, whilst for the latter a price of 80s. per 200 lb. bag applied. Consideration was also being given to the extension of these prices for a further two years.

Whilst the success of the incentive wheat price can be seen the success or otherwise of those applicable to groundnuts and soya beans will only become apparent in the future. However, a warning at this stage in respect of incentive prices will not be amiss. Incentive prices introduce a degree of artificiality into production and whilst in the short term can be regarded as beneficial by ensuring, as far as possible, that producers during the first phase see profit from their endeavours, agriculture in the long term cannot survive under such a pricing system. With limited local markets and overseas markets conditioned pricewise by world production, producer prices must bear a close relationship to these market conditions. Under the umbrella of incentives producers must aim for higher yields through improved cultural techniques leading to lower unit costs, so that a removal of incentives is compensated. At this point the country will be in a competitive position in markets without the necessity of a high level of subsidization which, unlike other highly industrialized countries, this country in its developmental stages cannot maintain.

Marketing and Pricing

Agricultural Marketing Authority

The question of a major reorganization within the marketing structure was touched upon last

year. At the end of the review period the matter was brought to finality with the establishment of the Agricultural Marketing Authority by Act of Parliament on 1st October, 1967. Appointed as Chairman of the Authority was Mr. William Margolis, O.B.E. and members were Sir Cornelius Ewen Mclean Greenfield, K.B.E., C.M.B., Mr. James Scott Brown, O.B.E., Mr. Eric Wefstead Hornby, Mr. Glynn Richards and Mr. William Norman Wells. The Act made provision for the conferring of powers and functions on the Authority in relation to the marketing of designated agricultural products other than tobacco, to constitute the Cold Storage Commission, the Grain Marketing Board and the Dairy Marketing Board, and to constitute any other statutory board established in connexion with the marketing of an agricultural production. At this stage the operation of the Authority awaits to be seen but, in view of the wide experience of the members of the Authority, its terms of reference plus the added co-operation of present marketing organizations in all spheres of agriculture, one can envisage success being achieved in the field of future marketing activity through this central co-ordinating body.

Beef

Producer prices announced at the end of 1966, to be effective during 1967, showed no change from those which operated during 1966, and were expected to retain the over-all average price of 154s. per 100 lb. cold dressed weight. However, to meet then existing conditions an incentive bonus was paid on all male cattle grading Chiller 1 to "X" grade inclusive, sent to the Cold Storage Commission for slaughter during the five-week period commencing December 26th, 1966. Bonus rates ranged from 5s. to 20s. per 100 lb. cold dressed weight depending on the period cattle were delivered.

Grade definitions for cattle were modified as from the 1st January, 1967, in order to conform more closely to market demands. The main changes occurred in the chiller grades of beef and were aimed at giving a clearer definition of cattle falling within these grades.

Irrespective of the increased marketing difficulties encountered through the imposition of mandatory sanctions against beef, exports were maintained. With increased movement of beef in world markets prices tended downwards and this movement was reflected in realizations by the marketing organization. It was unfortunate that with this decline the position was aggravated by a fall in the world price of hides. However, all in all the position could be regarded as satisfactory and future prospects are good. Of special note during the year was the decision to proceed with the erection of a new abattoir at Gatooma.

Sheep

In order to encourage this line of production an improved price schedule was introduced as from September, 1966. In the past prices paid for sheep and lambs had not reflected seasonality but this aspect was covered with the price announcement. The seasonal periods run from January to August and September to December. A price increase in the latter period of 2d. per lb. cold dressed weight is applicable to the top grade of mutton and the three upper grades of lamb.

The local market for mutton and lamb was not satisfied by producers and with the strict curtailment of imported supplies the opportunity remained for producers to meet a growing demand. However, the local market is not such that unlimited supplies at present prices can be absorbed and producers should continually take into account the market position in planning their future operations.

Dairy

The question of the introduction of a milk quota scheme was a major topic during the year. Negotiations between the Dairy Producers' Association and Government took place on many occasions and these finally resulted in a proposed quota scheme being put to referendum in May, 1967. This action resulted in a certain amount of controversy throughout the country and the results of the referendum bore this out. Voting resulted in 55 per cent. of producers favouring such a scheme but as it had been previously agreed that at least two-thirds of producers voting must favour the scheme, the question of its introduction was dropped. However, following a short interval the matter was again raised and a final decision as to whether to drop the subject of a milk quota scheme for four years or endeavour to obtain the necessary two-thirds majority through a referendum on an amended scheme had not been resolved by the year end. It is a matter of importance that the introduction of such a scheme or not be finally resolved in order that the present disruptive

uncertainty which prevails in the industry be brought to an end.

In respect of producer prices these remained unchanged over the review period following retrospective price adjustments announced in December, 1966, to be effective from 1st July, 1966. These seasonal prices were expected to return to the producer an average of 36 pence per gallon inclusive of the quality premium and would continue until December, 1967, prior to which date prices would be fixed for the following six or twelve month period.

Whole milk intake continued its upward trend but to date this tendency has not proved an embarrassment to the Dairy Marketing Board. Efforts by the Board to promote the consumption of dairy products are now proving fruitful and there seems little reason why this increased consumption pattern should not continue with producers benefiting from the over-all results.

Maize

Following the submission of the report of the committee, which investigated the case for the introduction of bulk handling of maize, Government accepted the principle subject to the first installation being regarded as a pilot project to prove the economics claimed for bulk handling and storage depots. A sum of £200,000 was voted for this purpose so that a start could be made during 1967-68, with a view to bringing the first depot into operation during 1967.

In the sphere of pricing, a committee of officials, together with representatives of the Rhodesia National Farmers' Union, met during the year to recommend on a maize price formula which might best meet the requirements of producers and Government in regard to the problems facing the maize industry at this time. In all some 10 different methods of price fixing were investigated and these were submitted to the Grain Producers' Association for further consideration. The final outcome was that producers agreed that the present method of pricing was a good one and could not be improved on at this stage. Under this system the producer receives the blend price resulting from local sales and nett export realizations.

For the year 1966-67 a final producer price of 31/8.786d. per bag was paid and for the 1967 crop a price of 30s. per bag was announced in February, 1967, to be effective for the 12-month period from the 1st May, 1967.

Maize production in the major producing countries reached record levels in 1967, and this coupled with the closure of the Suez canal resulted in world prices falling whilst transport costs increased. Such a situation must reflect itself in the price the producer can expect to receive and whilst a price of 30s. per bag is presently in force there can be no guarantee that a price level of this order can be maintained next year. Under the accepted pricing system producers must consider these international trends in their production plans.

Cotton

Latest information indicates that world cotton production in 1967-68 will approximate to that for 1966-67, and will be some 5½ million bales below the record 1965-66 crop. Consumption of cotton is expected to exceed production by around 5 million bales in the current season. Thus world stocks estimated at about 26 million bales in August, 1967 will be reduced to around 21 million bales. Most of the reduction will be in the United States.

On the local scene cotton production can be regarded as satisfactory and is playing an increasing role in placing the agricultural industry on a broader base.

In line with market realizations producer prices for seed cotton from the 1967 crop were increased, that of the top grade to a level of 8½d. per lb. As far as future trends can be gauged the market for cotton lint can be regarded as buoyant and future producer prices can be expected to reflect such a situation.

To facilitate the handling of the cotton crop a further cotton ginnery was brought into operation at the commencement of the intake season. No major changes occurred in the marketing arrangements during the year although a three-year agreement was concluded between the Cotton Marketing Committee and their cotton brokers. The agreement covered the disposal of cotton lint and in addition the provision by the brokers of seed cotton grades, cotton classifiers and technical and laboratory facilities.

Rice

The country has always relied on imports for rice suppliers. The possibility of local production was further explored and as results in South Africa indicated that rice production under irrigation was a feasible economic project the Sabi Limpopo Authority, together with other producers

situated in the lowveld, undertook plantings the result from which will be seen in 1968.

World price levels for rice show a firm upward trend and it appears that demand for rice will continue to outrun supply. Provided results from these initial plantings show promise the prospects for increased local production, not only to replace imports, but to satisfy other markets, appear good.

Oilseeds

Mention has been made of the incentive prices applicable to both groundnuts and soya beans and the effect of such prices on production awaits to be seen. In addition to these oilseeds the availability of cotton seed has improved which in itself has allowed its substitution for the more valuable groundnuts both in the expressing and livestock feed sectors. The place of sunflowers also deserves mention and whilst no incentive prices are applicable in this case there is every indication that this crop, especially with the introduction of higher oil content varieties, can play a small but important role in farming programmes.

African Co-operatives

The co-operative movement in the African field again expanded considerably during the year by the registration of more primary societies for marketing and agricultural supply, chiefly in the Tribal Trust Lands, and by the increase of membership in the existing societies.

Expansion also took place in the secondary field of co-operative development. There are now four unions registered for African development, being situated in Umtali, Fort Victoria, Que Que and Enkeldoorn. A fifth one is due to be registered in Salisbury early in 1968, and this will be by far the largest to date. Not only have these unions proved to be efficient in the handling of members' marketing, supplies and bank problems, but they are enabled to take more duties off the hands of Government staff by employing their own clerical staff thus enabling the existing Government staff to do more extension work in the field.

The experiment in rural bank services to societies in the Sabi Valley introduced by a commercial bank during 1966, has been an undoubted success. This venture can be claimed to be the forerunner of the now introduced mobile bank service in the rural areas carried out by the banks by means of Landrovers.

Agricultural Loan Fund

The majority of the loans issued by the Fund during the twelve months from 1st July, 1966, were again made through the Co-operative Societies and Unions. However, the over-all number of loans applied for and approved for African farmers during 1966-67, were down by about a third, when compared with the previous year. To appreciate this position one must take account of the fact that these farmers had experienced two very difficult seasons in 1964-65 and 1965-66, and because they were not able to meet previous loan repayments, held off applying for new loans. However, it is encouraging to see that in the early part of the 1967-68 financial year the number of loan applications has shown a marked increase. Loans issued during 1966-67 amounted to some 8,250, whilst in just over three months of 1967-68 the figure had exceeded 6,000.

Loan recoveries over the year could be regarded as reasonable although at the end of June, 1967, an amount of some £190,000 was still outstanding. With the increase in the lending activities of the Fund, it was found necessary to establish a separate recovery section to check any tendency towards a build-up of outstanding debts.

Rhodesia Freedom From Hunger Campaign Committee

This organization sustained its good works during the year and consolidated its position of acceptance by the indigenous peoples throughout the country. The number of its Regional committees was increased, bringing together like minded people to spread the Campaign and to ensure that projects undertaken were suitable to the requirements of the particular area in which they were introduced.

With the end of the drought in 1967, the Children of the Drought feeding scheme was brought to a successful conclusion; at its peak some 26,500 children were receiving a daily supplementary meal. The release of funds from maintaining this scheme were utilized to expand the provision of high protein foods to hospitals and clinics. The advice given by qualified people upon distributing these foods to mothers has been proving its value and the rapid spread and acceptance of the scheme, coupled with the parents' willingness to pay has exceeded all expectation. This position has led to the reduction in the subsidy applied to the cost of the commodities provided and the ultimate aim

is that through usage and the obvious benefits resulting, to gradually reduce the subsidy until the full cost is being paid by the parent with the foodstuffs accepted as a normal part of the everyday diet.

Since mention last year it was found possible to transfer the grants from London made by the United Kingdom Freedom From Hunger Committee for the provision of buses to bring Africans to places of agricultural interest and for mobile agricultural training units. With assistance from the African Development Fund it was possible to complete the project to give to the Department of Conservation and Extension five buses, five mobile training units, and one machinery unit for work which has the same objectives as those of the Campaign. All are fully employed and their value has been proved beyond doubt.

The Campaign is dependent largely upon the public to finance its activities and without the wholehearted assistance of the people of Rhodesia few of these activities would be possible.

Mr. L. T. Tracey, O.B.E., M.C., the driving force and inspiration behind the Campaign from its inception, retired from his Chairmanship in September, 1967. He has made a tremendous contribution to agriculture in many ways and his term as Chairman of the Campaign has not been the least of his achievements. Mr. J. M. Hammond, former headmaster of Domboshawa School and well known in the field of African Education, has now taken over the reins of this office.

Farmers' Assistance Committee

The establishment of this Committee was undoubtedly a success in assisting those worthwhile farmers who, due to circumstances outside their control, found themselves in financial difficulties. However, in the operations of the Committee it became apparent that with the absence of legislation, assistance was being hampered. Accordingly, legislation in the form of the Agricultural Assistance Act was enacted in December, 1966. Under this Act the Committee's affairs and obligations were vested in the Agricultural Assistance Board.

From its inception in March, 1966, until the establishment of the Board, the Committee received and dealt with over 750 cases. This in itself was a task of some magnitude considering that this type of assistance was such that a system of operation had to be built up over the initial period with little precedent to go by.

Of the cases considered some 327 were withdrawn or rejected whilst of the remaining 427, short-term loans were granted to 97 applicants and long-term loans to 330. In many cases creditors accepted a two-year moratorium in return for part settlement of their debts whilst in a number of cases sums received by creditors were accepted in final settlement. In all some £654,000 was granted to farmers and what is worthy of mention is that by the end of September, 1967, approximately 30 per cent of the short-term loans had been repaid.

From its inception the Agricultural Assistance Board undertook the finalization of the assistance afforded by the Committee in addition to its new role.

Without doubt the manifold activities of this Committee undertaken at a critical time helped considerably towards stability in the agricultural economy and the effective groundwork laid down made the introduction of the Board that much easier.

Agricultural Assistance Board

The objectives of the Board and provided for in the Agricultural Assistance Act were to assist and rehabilitate farmers by way of effecting a compromise with the creditors of farmers, providing for the payment in full or part or the suspension or cancellation of certain claims against farmers and the supervision of the operations of farmers. Whilst the forms of assistance were many and varied, limitations, as to whom the Board could assist, were incorporated in the legislation. Such limitations implied that the applicant with assistance would be able to carry on farming operations with a reasonable prospect of success and that the need for assistance had been primarily caused by climate or other natural causes which were beyond the control of the applicant and occurred without any substantial fault on his part. With the passage of time it became apparent that the limitation relating to climatic and natural causes was too restrictive and an amendment to the legislation to allow assistance to be afforded to farmers in difficulty due to other causes was introduced in September, 1967.

In addition to finalizing the undertakings of the former Farmers' Assistance Committee, the Board immediately undertook the acceptance of applications from farmers for assistance under the new legislation. By the end of September, some 171

applications had been received of which 37 had been assisted in various forms including 14 vested estates. Of the balance 16 had been withdrawn or were invalid, 82 were being processed and five were awaiting a Board decision and 31 had been rejected or decision deferred by the Board.

In viewing the so far limited activities of the Board there is every indication that its establishment will prove beneficial to not only the agricultural sector but the economy as a whole. A much greater degree of control can now be applied to those farmers who are assisted and this in itself should, with the available management facilities, ensure that a rehabilitated farmer is enabled to continue his farming operations with a much greater degree of success.

OUTLOOK

The viability of any country depends on its ability to pay its way in the sphere of international trade, a factor well known and one on which pressures can be applied by outside influences to reach a desired solution. However, the opportunity always exists to circumvent such pressures but this necessitates changing production to take advantage of such opportunities.

The term diversification of production is uppermost today but just as important is the acknowledged versatility of the Rhodesian farmer to apply himself to this task. Tobacco producers especially have accepted the challenge confronting them and it is indeed gratifying to acknowledge the steps they have taken. Competition, which in certain respects could be regarded as unfair, existed for many years in the international trade in tobacco. Even so, by providing markets with the quality and types of tobacco they required and more important at competitive prives, the tobacco producer has shown his worth. Today the position is somewhat more complex but by adaptation to the requirements of available markets the industry will continue to play its part in the over-all economy.

Sugar cane producers have also been confronted with marketing problems a number of which have confronted all sugar producing countries, namely, those arising from the supply/demand condition in world markets and its resultant effect on prices. World prices have continued to be at a low ebb and without outside pressures producer returns would have given small remuneration. A committee under the chairmanship of the Deputy Minister of Agriculture, Mr. L. B. Smith, M.P., has been continually involved in the problems facing the sugar planters. Assistance from within the sugar industry and by Government has been afforded. In addition by undertaking the production of alternative crops the planters and indeed the estates have broadened their production base which could bode well for the future well-being of this industry although availability of land will present a continuing problem to the planters.

The future prospects for maize production have to be viewed in the light of record world production of coarse grains and whilst consumption increased this did not absorb all of the increased production. World prices show a downward trend and it is this factor which will play an increasing part in the level of return to the producer. Production costs must be continually watched and for many farmers serious consideration should be given as to whether it would not be more worthwhile to limit maize production and concentrate on alternative crops.

Prospects for cotton appear reasonably good but this is not to say that some downward adjustment in producer prices may not take place in the future due to changed circumstances on world markets. However, techniques in cotton production are improving with a corresponding beneficial effect on yields and provided good yields can be maintained the margin between costs and returns should remain satisfactory.

In the case of both wheat and rice the local market offers a satisfactory outlet and those farmers who have, or are able to consider the installation of irrigation facilities, should bear these crops in mind. Whilst rice production can be termed a new crop to the Rhodesian farmer there seems no reason why it should not play an increasing role in the production pattern. Latest information points to a continuing world shortage of rice so whilst the local market is small opportunities do exist elsewhere.

Oilseeds, especially groundnuts and soya beans, are crops the potential of which has not yet been exploited, but for which markets do exist. The consumption of soya beans and oil is increasing in world markets and whilst national yield levels at present give little scope for a satisfactory return, good yields are possible.

There has been a somewhat large upsurge in the planting of deciduous fruit trees over the past two years and whilst such action can be com-

mended from the point of view of diversification, the question of outlets could present a problem. With the perishable nature of deciduous fruit and associated storage problems the question becomes one of disposal over a relatively short period. The local market and industries continue to take increasing quantities of such fruits but greatly increased plantings without consideration of market outlets could prove detrimental to this sector of agriculture.

Comment has been made on the role of the cattle industry and prospects in this sphere can be regarded as satisfactory. However, a word of warning on one aspect is necessary. It has been noted and not without comment by the Ministry, that the level of prices being paid by farmers, for both store and breeding animals, are such that related to slaughter prices can be expected to give little if any profit margin to the producer. Whilst a favourable remedy would be an increase in slaughter cattle prices, warnings on such expectations have been given. Farmers purchasing stock should examine closely the present price schedule for slaughter stock and buy accordingly, as Government cannot be expected to put to rights imprudent buying.

Expansion in milk production has continued at a rate about equivalent to what was expected. Consumption of milk and milk products has however shown a movement upwards from the near static position apparent over recent years. This is a pleasing trend and has been a major factor in stabilizing producer prices. Such prices cannot be regarded as unremunerative provided good management is practised. Provided the increasing level of production is kept within limits consistent with consumption trends the impact on producer prices should not give cause for concern. However, there is a body of opinion which considers that production should be controlled to a level consistent with consumption to avoid any downward movement in producer prices. The question of controlled production is a vexed one which will require clarification in the near future to ensure that the disruptive uncertainty which exists in the industry is removed.

The question of over production of both pigs and poultry has given cause for concern over the past year and this is readily understandable when one considers the somewhat violent fluctuation which can take place in these lines of production over relatively short periods. Intending producers should therefore critically examine the prevailing situation and future prospects before expending capital on these lines of production.

In regard to the financial position of agriculture, the establishment of the Agricultural Assistance Board and indeed the previous operations of the Farmers' Assistance Committee highlighted the grave financial situation many farmers had found themselves in due to injudicious expenditure and lack of appreciation of the need to establish a sound capital structure. Not all the blame can be attached to climatic, disease, or even extraneous circumstances. The desire for the possession of land would appear to override expenditure considerations with the result that agreements are entered into on terms which could only be met under the most favourable and optimistic conditions, a dangerous assumption in farming. Assistance can now be afforded but not in every case so it is essential that capital expenditure on land and improvements is related to their earning capacity to give a return on such expenditure under circumstances prevailing at the time of purchase. The ill-use of credit facilities is a further aspect worth stressing. Traditionally farming relies on credit for its pursuit but here again evidence points to a lack of credit appreciation. However, whilst criticism can be directed towards the farming community for such misuse the availability of credit involves the supplier who cannot be freed from a similar level of criticism for making credit easily available without making a more thorough investigation of the borrower's creditworthiness.

In conclusion, stress is again laid on the productiveness of our major asset, land. However, the level of productivity is largely dependent on the producer, of reasonable capabilities, receiving a return commensurate with his efforts. On this score criticism is often directed at farmers for the level of government assistance they receive without a critical examination of such assistance being made. Often one could argue the form of assistance is just as beneficial, if not more so, to the consumer. A tradition has built up that the recognized basic products of agriculture should reach the consumer at low prices and increases in such prices generally raise a storm of protest. On the other hand, input items necessary to the farmer tend to increase, as do indeed many other consumer items, but little is said on the latter and on the former recompense is often given in the form of advice to increase efficiency. Whilst efficiency can count the consumer must also share some of the cost of maintaining a viable agricultural

industry and the benefits of any assured supply of the basic necessities of life. If such action proves untenable from a social point of view then means should be provided from the social sphere and not the agricultural industry to bear the cost. This in itself would again remove certain criticisms that the farmer is the major beneficiary. Provided that agriculture can be shown to give a reasonable level of income and not just a way of life, encouragement will be provided for attracting new entrants, especially of the younger generation, to the industry. Whilst the present number of farmers is showing a decline, productivity from the remainder is increasing. This increased productivity must be maintained and by eliminating as far as possible the fears that a reasonable return on judicious investment will not result, will go a long way towards meeting this objective.

Acknowledgements

For the willing co-operation received from other Ministries, statutory marketing organizations, private enterprise, farmers and many other committees and bodies grateful acknowledgement is made. I also wish to convey my appreciation to all members of the Ministry. All sectors and officials in many capacities showed a grand spirit in overcoming obstacles placed in Rhodesia's way.

R. A. GRIFFITH,
Secretary for Agriculture.

Economics and Markets Branch Report

for the period 1st October, 1966 to 30th September, 1967

Continued operation under conditions of abnormality together with the occurrence, after a number of years, of a favourable agricultural season, resulted in officers of the Branch being involved to a greater extent in the planning necessary to ensure the continued viability of the agricultural sector and the handling and disposal of the resultant products.

Notwithstanding this involvement greater emphasis was placed on field and other surveys to determine the financial position of individual farms and farming sectors.

Field and Others Surveys

During the year a major change in the conduct of field surveys was introduced. It was resolved in principle that the Branch's requirements would best be served by the largest possible Farm Management Survey from which ancillary information may be derived. The survey provides information on present levels of farm performance, alternative production patterns and present levels of standards of improved performance.

The practical applications of the survey are in:

(a) Management advice to individual farmers. This aspect is related particularly to use made of the survey by other departments.

(b) Project assessment, e.g. land settlement or irrigation schemes.

(c) Capital requirements—operating and fixed.

(d) Commodity costs of production where these are a factor in pricing.

(e) Area assessments in relation to potential climatic influences, etc.

(f) Farming systems—area suitability, etc.

(g) Standards and data on resource use.

The survey is, as far as possible, based on approximately a 6 per cent. sample of the total European farming population and arrangements are in hand to have results processed by computer.

The more important of the surveys completed during the review period were:

(1) The Cost of Production of Single and Double Hybrid Seed Maize for the 1965-66 Crop.

(2) Broiler Production Costs.

(3) The Cost of Production of Seed Potatoes for the 1965-66 Crop.

(4) Irrigated Cotton—Cost of Production 1965-66.

(5) Trade in Ration Beans—An Appraisal.

(6) Vegetable Oils—Substitution for Imported Oils.

(7) Assessment of the Potential for Groundnut Production in Rhodesia.

(8) Agricultural Potential of Rhodesia in Relation to Population Growth.

(9) The Cost of Production of Flue-Cured Tobacco for the 1965-66 Crop.

In the case of the survey into the Cost of Production of Flue-Cured Tobacco for 1965-66, results were computerized for the first time. The assistance of the Central Statistical Office and the Treasury in this development is gratefully acknowledged. This survey is being continued on the basis of a two-year identical sample.

Farm Management Work

With continued emphasis on the development of a sound financial and administrative approach to farming and the necessity for many farmers to adapt their farming programmes, officers of the Farm Management section were increasingly called upon to advise on economic planning. To ensure as wide a spread as possible for such advice training courses for Extension Officers of the Department of Conservation and Extension, as well as officials of the Land Bank and Gwebi students were undertaken. In addition to these formal courses, the three Farm Management economists provided training courses for both specialists and field extension staff in the techniques of record keeping and farm management analysis. As part of the diversification programme officers attended some 24 meetings on this subject alone, as well as attending numerous other farmer gatherings to discuss a wide range of subjects with economic implications.

The management discussion group system of record keeping was well supported. From 50 effective participants during the year 1965-66, participation increased to 67 in 1966-67. This increased interest by groups of farmers in many areas is encouraging and the results obtained from records

have been of value to the Branch and to the Extension Service.

A considerable amount of time was spent in devising methods and standards to be adopted in connexion with farm management records. This is a continuing process, especially with a relative new service. A new series of analysis forms were introduced during the year.

Another new aspect of the work was the preparation of a complete set of record forms for Purchase Area farmers. In addition a diary was prepared for the use of these farmers from which entries can be transcribed on to analysis forms by extension assistants.

To maintain and expand farmers' use of record keeping, and to provide the other farmer-services of the farm management team that are in increasing demand necessitates reviewing the complement and functioning of this section.

African areas

The Branch continued its survey into the costs and returns for a number of African Purchase Area farms and individual results over two years have been completed. Work is now in progress on a report covering the results obtained. A report covering socio-economic conditions within the Shashi Irrigation Scheme was prepared during the year. The economic survey among African farmers on the Nyamaropa Irrigation Scheme in the Eastern Districts, referred to last year, ended in May, 1967. The graduate to whom the Ministry gave financial assistance is presently preparing his thesis.

Committee Work, Special Projects, Lectures, etc.

For a number of inter-departmental and Ministry Committees and Working Parties the Branch was called upon to provide representatives and in a number of cases the Chief Agricultural Economist acted as Chairman. The former included the Irrigation Co-ordinating Committee, the Sabi-Limpopo Authority Land and Water Planning Committee, the Transport Priorities Committee, the Industrial Tariff Committee and the Beira Port Traffic Advisory Committee. The latter included committees and working parties on the Long Term Maize Pricing Policy, Wheat Incentive Price, the Bulk Handling of Maize and the Chirundu Sugar Estates.

Officers of the Branch were actively engaged in the problems of the lowveld sugar planters and in administering import control in so far as it affected the agricultural industry.

Lectures were again given to students at the Gwebi Agricultural College.

The Quarterly Economics and Markets Report continued to be published with more emphasis being placed on articles of a general economic nature.

Staff

For most of the year the staff position was satisfactory. An early resignation was filled almost immediately but unfortunately this officer was called up for military training shortly after his appointment. Towards the end of the year three members of staff resigned and in addition the Chief Agricultural Economist was loaned to the new Agricultural Marketing Authority. These resignations, all of which were in the field survey side of the Branch, came over a very short period. Credit is due to the remaining officers involved in this work who responded well to the added pressure of work.

Recruitment of officers to fill these vacancies was underway at the close of the review period and as an experiment it was agreed that a non-graduate be recruited to fill one of the vacancies as a technical assistant in field survey work. If this is a success then further recruitment of such officers will be considered. The professional officer, whilst still undertaking a certain amount of field work would then be able to devote a greater proportion of his time to more specialized work commensurate with his qualifications.

Whilst a certain amount of work is undertaken in African areas, this remains completely inadequate in relation to the magnitude of the economic problems, practical solutions for which, can be developed only if adequate information is available.

Publications

These covered a wide range of topics and appeared in a number of farming journals:

1. Farm Machinery Records and their Application.

2. Livestock Values.

3. Development of African Tribal Areas would Give the Economy a Valuable Boost.

4. High Yield Maize Costs on an Intensive Farm Unit.

5. Effect of Labour Availability and Curing Capacity on Profits from Flue-Cured Tobacco Production.

6. Returns from Poultry Production.

Acknowledgements

To the many farmers whom Branch officials came in contact with, other branches and departments of this and other Ministries and officials of farming organizations, grateful acknowledgement is made for the willing co-operation and assistance received.

I. J. DOUGLAS,

Acting Chief Agricultural Economist.

Annual Report of the Co-operatives and Loans Branch

for the Year 1967

1. INTRODUCTION

This has been a year of consolidation in the co-operative field of this country. For those who seek the dramatic in this year's work there can only be disappointment. For those who realize the importance of stability in the work undertaken by the staff, there will be a sense of comfort, possibly even a sigh of relief, that the rapid expansion demanded of the Branch which has strained it to the utmost in the last few years, is at last beginning to steady down.

This does not mean that there has been no development, on the contrary both the number of societies registered and the membership figures have increased; but it does mean that there has been more time available for education, a vital feature in the Branch's activities if the movement is to maintain its most satisfactory level in Rhodesia.

In the African agricultural field alone membership has increased from 19,342 to 22,543, the number of primary societies registered from 213 to 236 and the cash handled from £922,322 to £1,142,267.

For the first time in the history of the African Agricultural co-operative movement the total cash handling of these societies in one year has exceeded the million pound mark. The figure of £1,142,267 is a great credit not only to the officials of the Branch but to all personnel of the societies themselves.

In this last year the two big banks have instituted rural services—mainly as the result of a successful experiment initiated with certain co-operative societies by the staff of this Branch some while ago; this is an example of how the co-operative movement can assist the community as a whole, not only just its members.

In the latter part of the year the Registrar, together with the Registrar of South Africa, was honoured with an invitation from Moçambique to visit that country, and advise on certain matters concerning the development of the co-operative movement there—Angola also sent its representatives. The seminar proved to be very constructive and it is hoped that the conclusions will prove to be of value to the participants in the future.

2. PROGRESS

(A) General Information

(i) *African Societies*

Again this year a difficult marketing season was experienced. Heavy weevil infestation lowered maize prices considerably and caused despondency amongst some members. Every attempt to combat the problem was made, but the low grading still presented a heart-breaking picture particularly to the small producer.

The three African Co-operative Unions formed last year more than lived up to their hopes, and have had a greater initial success than was expected. Two more Unions (one at Que Que and one in Salisbury) were formed and registered during the year. The former consists of 11 societies and in less than eight months produced a turnover of £106,420, thus proving itself in that quarter alone in addition to being able to organize a more rapid payment to members for their produce through the rural banking service. The Salisbury Union was formed by 49 societies and registered on 28th December, 1967—it will commence its activities in earnest in the new year.

Brother Waddelove of Chishawasha Mission is doing sterling work in the Credit Union field of African co-operative societies, and, although no more such societies have been registered during the year, a great deal of educational work towards this end has been undertaken.

(ii) *European Societies*

No more have been registered during the year and, with the exception of one dormant society, most of the existing 11 are doing useful work for their members. Paragraph 3 (B) of this report gives a comparison with last year's figures to indicate progress. Annexure B shows development in the societies engaged in these agricultural activities since 1964. That was the first year in which Europeans were permitted to use Chapter 225 as Federal legislation forbade them to do so previously.

(iii) *Categories of Registered Societies*

The following is a list of the types of societies registered under Chapter 225 and functioning as at 31st December, 1967:

African Marketing and Agricultural Supply Societies	236
Indian Thrift and Loan Societies	2
African Marketeers Society	1
African Housing Society	1
European Marketing and Agricultural Supply Societies	8
European Potato Marketing Society	1
European Honey Society	1
Rhodesia Cotton Growers Society	1
African Credit Unions	4
African Co-operative Unions	5
	260

(B) Marketing

Of the 236 African Marketing societies only 16 failed to market any produce. The remaining 220 societies marketed as follows:

Produce	*Sacks*
Maize—Grade A	159,644
B	102,946
C	24,807
D	7,059
Shelled Groundnuts—A	298
B	19,504
C	730
Sorghum—A	8,528
B	24,508
C	17,790
D	4,250
Munga	1,299
Sunnhemp	364
Sunflower	518
Beans—Velvet	2,653
Sugar	1,974
Ration	372
Cowpeas	1
Wheat	820
Potatoes	1,326
Maize meal	1,694
	381,085
Seed Beans (322,330 lb. @ 112 lb. per bag)	2,878
Green Peas (216,001 lb. @ 200 lb. per bag)	1,080
	385,043
Burley Tobacco	153,182 lb.
Greenleaf Tea	18,231 lb.
Sweetcorn	35,195 lb.
Ginger	57 lb.
	206,665 lb.
Cotton—Class A	3,898,006 lb.
B	710,580 lb.
C	230,644 lb.
Unclassified	138,010 lb.
	4,977,240 lb.

Also: 7 cases of bananas, 90 dozen eggs, 8,021 lb. of seed lettuce and 1,157 lb. of seed tomatoes have been marketed. The weight of the two seed crops represents the gross weight, which will be reduced on cleaning. Cash payment has not yet been received for these last two crops.

In addition the following livestock was marketed:

		Head
Cattle—Grade	Chiller	96
	GAQ	510½
	FAQ	480½
	Compound	103
	Inferior	171
	Rejects	5
	Condemned	2
		1,368
Sheep		72
Pigs		250
Goats		33
		355

The number of livestock marketed is 531 head more than last year.

The above represents the total produce marketed by 220 societies with 21,543 members and gave a crop and livestock turnover of £823,020, an increase of £34,542 over last year's figures.

African societies issued 513,133 sacks to their members at a total value of approximately £96,212 and hired transport for the marketing of members' produce and for the cartage of supplies at a cost of £69,269.

Produce marketed by African societies in 1967 was graded as follows:

Grade A	168,470 sacks
B	146,948 sacks
C	43,327 sacks
D	11,309 sacks

The following figures show the quality of produce in percentage of grades marketed by African societies since 1959:

	Grade					
	S	A	B	C	D	X
	%	%	%	%	%	%
1959	—	67·00	32·60	·40	—	—
1960	—	91·52	8·01	·47	—	—
1961	—	72·99	21·11	5·89	·01	—
1962	0·20	67·00	26·76	6·04	—	—
1963	2·15	71·50	24·92	1·43	—	—
1964	1·38	87·17	9·90	1·55	—	—
1965	·12	91·07	7·77	·82	—	·22
1966	2·86	59·00	29·36	4·98	3·80	—
1967	—	45·52	39·71	11·70	3·07	—

Grain grading courses were held by the Grain Marketing Board for staff and society officers but, again this year, the figures reveal a disappointing drop in the high grades of sacked produce marketed by societies when compared with those of the past years. A high incidence of weevil infestation, commencing even when the cob was

on the stalk in the lands, accounted for the majority of the lower grades but poor grading by some society officers cannot be altogether ruled out. Co-operative societies affected by weevil (largely in Mashonaland) purchased quantities of 1 per cent. Malathion and tried to persuade their members to use it but education of this nature is essentially slow in showing results. Where members used it the results were satisfactory and it is hoped more will be used next year should this infestation re-occur.

(C) Supplies

Through cash and short-term loans the following have been purchased by members through their societies in 1967:

Fertilizer . .	£116,719
Seed	£19,446
	£136,165

These figures show a decrease of £4,940 over last year's figure of £141,103.

Also by means of cash and medium-term loans members have purchased through their societies agricultural equipment to the value of £34,808. This figure represents an increase of £5,139 on last year's figures probably accounted for in part by the increased purchases of cotton spraying equipment by societies to cope with the larger cotton crop.

3. DETAILS OF CO-OPERATIVE SOCIETIES REGISTERED UNDER CHAPTER 225

(A) African Marketing and Agricultural Societies

There were 236 African Marketing and Agricultural Supply societies functioning under Chapter 225 in the year 1967. The areas in which they operated are as follows:

52	in Purchase Areas
170	in Tribal Trust Lands
13	in Irrigation Settlements
1	in Unreserved Land
236	

Statistical details of these societies in provinces and regions are as follows:

Province and Region	Number of societies	Membership	Share capital	PRODUCE AND LIVESTOCK MARKETED						Cash handlings
				In bags	Cotton (lb.)	Seed and bean crops (lb.)	Livestock (head)	Other crops		
								Crop	lb.	
			£							£
SALISBURY										
Salisbury . . .	12	1,274	1,761	32,541	40,682		371	Burley tobacco . .	17,600	98,731
Salisbury S.W. .	15	2,220	3,472	84,527	47,958			Burley tobacco . .	29,300	196,232
Salisbury N.E. .	15	3,165	3,167	29,209	365,478			Burley tobacco . .	103,400	129,768
Darwin . . .	10	1,366	1,608	64,861	10,859					113,116
VICTORIA										
Victoria West . .	21	1,933	2,740	36,461	7,003		77			71,882
Victoria East . .	17	1,991	2,410	7,771	117,697		174			27,963
Enkeldoorn . .	25	1,727	2,242	17,988	11,119	16,866	64	Burley tobacco . .	2,882	44,471
GWELO										
Gwelo Central .	15	695	927	14,616			33			33,995
Gwelo North . .	14	1,410	2,079	39,942	2,042,976					139,936
Shabani . . .	14	1,379	1,536	10,432						19,168
UMTALI										
Umtali	10	720	819	2,508	91,754		204	Sweetcorn . . .	35,195	29,739
								Greenpeas . . .	216,001	
								Greenleaf tea . .	18,231	
Umtali South . .	12	1,134	2,871	2,533	1,118,581	305,464	37	Ginger	57	85,736
									422,666	
								Bananas (cases) .	7	
								Eggs (dozen) . .	90	
Rusape West . .	9	845	997	15,955			129			39,696
Rusape East . .	11	1,017	1,942	12,452	1,016,623		22			73,911
BULAWAYO										
Bulawayo North .	15	614	805	7,717			274			21,036
Bulawayo West .	17	775	860	869			338			10,107
Bulawayo South .	4	278	278	703	106,510					6,780
TOTALS . .	236	22,543	£30,514	381,085	4,977,240	322,330	1,723		97	£1,142,267

Statistical details of each society (in scheduled form and grouped in regions) are available in the Head Office of this Branch subject to certain conditions. Similar schedules will also be available under like conditions for those societies grouped under paragraphs 3 (B) and 3 (C) and for co-operative companies grouped under paragraph 4 of this report.

(B) European Marketing and Agricultural Supply Societies

Total statistical details of European Marketing and Agricultural Supply Societies for the year 1967 are as follows:

Number of societies	*Membership*	*Share capital*	*Cash handled*
11	577	£5,768	£262,389

The above figures, in comparison with those of 1966, show an increase of 97 farmer members, £1,526 in share capital and £75,500 in cash handled. As these figures are for the same societies as last year, they indicate very creditable progress.

(C) Societies for purposes other than Agriculture

Total statistical details of societies registered both by the Indian and African communities for purposes other than for agriculture are as follows:—

Number of societies	*Membership*	*Share capital*	*Gross income*
8	864	£37,774	£6,118

The above figures in comparison with those of 1966 show an increase of 336 in membership and £2,819 in share capital. The gross income figures cannot be compared with those of last year as the income figures of one African Credit Society are not due or yet ready for publication.

(D) Co-operative Unions

The following unions are registered and functioning:—

Reg. No.	*Name*	*Membership*	*Share capital*
190	South Mashonaland Co-operative Union Ltd.	38 socs.	£1,075
207	Sabi Valley and Umtali Co-operative Union Ltd. . . .	7 socs.	£260
238	Enkeldoorn Central Co-operative Union Ltd.	25 socs.	£490
242	Sebungwe Co-operative Union Limited	11 socs.	£265
262	Central Mashonaland Co-operative Union Limited	49 socs.	£2,110

N.B.—No cash handling figures have been included in these statistics as they are already recorded society by society in other schedules, and accounted for under regional figures given on page 5A of the report.

DETAILS OF CO-OPERATIVE COMPANIES REGISTERED UNDER CHAPTER 181

Number of companies	*Membership*	*Share capital*	*Cash handlings*
18	8,511	£1,979,736	£15,046,012

One company was liquidated during the year.

The above figures show a decrease in membership of 100, an increase in share capital of £93,904 and a slight decrease in turnover of £732,011 which is quite understandable in view of current difficulties.

LOANS

The policy of the Agricultural Loan Fund in putting more and more of its loan finance annually through co-operative societies is proving embarrassing. Loans are causing members to evade marketing through their societies in order to avoid their repayment obligations, and this is forcing the co-operative staff in the regions to act as, and more important still to be regarded as, debt-collectors for the Fund. This is hampering co-operative extension work in the field, and is causing prospective members, who have old debts unpaid, to think twice before joining a co-operative as they well know that when they do join, a stop-order will be placed on their society for them and the co-operative staff will commence chasing them to honour their obligations. A complete re-organization of the Agricultural Loan Fund in its relation to African co-operative societies is necessary, and meetings to seek methods of bringing this about have already been held.

Since the first co-operative society was formed in October, 1956, the following is the approximate total of loans taken in the African movement: —

Short term (seasonal loans)	£300,000
Medium term (repayable over a maximum period of five years)	£140,000

Repayments on short-term loan capital have amounted to approximately £217,000 leaving a balance due of £83,000 with virtually no loans written off. This represents a repayment percentage to date of 64 per cent. Repayments on medium-term loan capital have amounted to approximately £100,000 also with virtually no loans written off. This represents a repayment of 71 per cent. Seasonal or short-term loan repayments have been poorer than usual in the last two years; one of the reasons for this is the heavy weevil infestation of the maize crop in Mashonaland, which province takes the largest proportion of the loans issued. Prices of maize have been low because of this

insect infestation, and this has tended to discourage marketing, as well as causing a poor price for the maize that was marketed.

As far as medium-term loan repayments are concerned it is thought that if a deposit were demanded of say 25 per cent. plus a cutting down of the repayment period of from five years to four years better results could be achieved. A recommendation to this effect has already been made.

During the last year societies have taken legal action against many of their members for unpaid loans with a communal responsibility and many arrears have been collected during 1967. Even stronger action will be undertaken in all probability by societies in 1968 (with allowances being made in the drought areas), whilst the Agricultural Loan Fund is itself taking legal action for outstanding agency loans implemented through societies. The full effect of this legal action in reducing arrears has not yet been felt as instalments are in the process of being paid as a result of judgements obtained.

STAFF AND ESTABLISHMENT

Details are tabled in Annexure "D" to this report. Decentralization of administration to provincial level has proved successful from all angles, and on the 1st July, 1967, two more posts of Principal Co-operative Officer were created, making five in all. These posts are in Salisbury, Gwelo, Fort Victoria, Umtali and Bulawayo—the two new posts being created in the last two mentioned places.

Three more regions were opened with effect from the 1st July, 1967, and posts for Co-operative Officers with their relevant African staff were created in Shabani, Rusape and Fort Victoria.

Annexure "E" shows the European staff distribution planned during the year, and which will be put into effect on the 1st January, 1968.

The comparatively new Inspection section of the Branch is just getting into its stride, and is providing valuable information through the checking of books and by reports as to where staff or society weakness lies in the African co-operatives. Not only is this service keeping a watch on accounting failures, but it is enabling the officer in charge of education in Head Office to arrange courses at regional level to eradicate these weaknesses.

The Branch continues to be represented on various Statutory Marketing Boards, and there is evidence of staff being consulted more and more in the African economic field.

Staff are to be congratulated on their devotion to duty and the long hours they have worked particularly in the field. Their patience and tolerance in difficult situations is worthy of high praise. It must be recorded, however, that although senior African staff have performed their duties on the whole very well, some of the junior African staff leave much to be desired in this respect. This section of the staff must learn to be tolerant of the tribesman's approach to matters, and not to regard themselves as superior to their elders merely because they can hang a framed Cambridge or G.C.E. Certificate on the walls of their houses. This is quite contrary to African good manners, and is probably a passing phase in the young emergent African, but it does not help the extension work for which these young men are employed and staff training is being implemented at Regional level to eradicate this undesirable approach.

GENERAL

Annexure "A" to this report provides a year by year comparison of figures of African Marketing and Agricultural Supply societies since the inception of the movement in 1956.

Annexure "C" to this report gives a year by year comparison of some figures of societies registered since 1959 for purposes other than for agriculture.

Possibly the most outstanding feature in this year's work is the marketing of 4,977,240 lb. of cotton by Africans through their societies in comparison with last year's figures of 3,384,389 lb. Cotton is an ideal crop for handling co-operatively, both from the point of view of marketing as well as from the angle of eradication of insect infestation—also being an inedible crop it does not find its way so easily into illegal or unauthorized markets as members' maize tends to do.

Three experiments were conducted in co-operatives this year; the first concerned a co-operative union owning its own transport; the second, some societies milling their members' maize and marketing it as meal in Area B (in Tribal Trust Lands) and the third, a society commencing grain storage facilities for its members.

The Enkeldoorn Central Co-operative Union purchased its own transport, a 7½-ton diesel truck with a five-ton trailer—both new. Society members are reported to be very satisfied with the service given although it may well have slowed up their marketing. It is too early to assess as to whether or not there is any permanent financial advantage in a society owning its own transport, but the scheme is being watched with great interest for possible implementation in other regions. In the first year, at all events, the transport has paid for itself as well as having given a 98 per cent. service to its members.

With regard to the second experiment (that of processing maize for consumption in Area "B"), this has motivated several societies in the vicinity of Lupani and Nkai. The two mills in this project have proved most successful, and credit is due to the Co-operative Officer in charge of the Bulawayo North Region for his initiative in introducing the scheme. A grain shed is in the process of being built at Lupani with the aid of the Ministry of Internal Affairs, and a similar shed will shortly be commenced at Nkai. Both these sheds will facilitate the working of the two mills. The members of the local co-operatives concerned are reported as being very pleased with the project, and are supporting it well.

In the case of the third experiment, the Sogwala co-operative in the Gwelo Central Region is building a grain store and planning to run a Grain Storage project for its members with the assistance of loans from the Freedom From Hunger Campaign. This storage will be in operation next year and figures from the project will be made available to the Government officers, who are conducting investigations into the best methods to be used to minimize insect damage in African stored grain at rural level.

The plan evolved by this Branch with the co-operation of the fertilizer companies in zoning areas on a voluntary basis to the various companies functioning in African areas had its trial period this year. The staff of this Branch, the societies themselves and the fertilizer companies have recorded it as a success and especial thanks are due to the companies for accepting the Registrar's suggestions and for implementing them so readily.

Close liaison was kept by all officers of the Branch with district officials in the Ministry of Internal Affairs and with officers of the Department of Conservation and Extension. It is hoped that there will be even closer liaison in 1968 especially in regard to the granting of loans, and the follow-up of the proper application of the items purchased thereby.

Finally, it is desired to place on record the grateful appreciation of this Branch for all the assistance given to the staff by Provincial Commissioners, District Commissioners, District Officers, Provincial Conservation and Extension Officers, Group Officers, Agricultural Extension Officers, and their African staff, Banks, Grain Marketing Board officials, Transport contractors, Railway officials, and all those persons who supply equipment, seed, fertilizer, sacks, and services to societies, and to all those Administrative and Accounts officers of the Ministry of Agriculture who have assisted in the smooth running of the Branch in the biggest year it has yet experienced.

R. J. DINNIS,

Under-Secretary and Registrar of Co-operatives and Loans Branch.

ANNEXURE "A'

ANNUAL STATISTICS
AFRICAN CO-OPERATIVE SOCIETIES REGISTERED UNDER CHAPTER 225
FOR MARKETING AND AGRICULTURAL SUPPLIES

	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Registered societies in operation	2	6	12	14	21	38	52	67	110	169	213	236
Buying depots	4	11	22	26	27	78	130	167	226	301	429	507
Membership	187	398	765	1,206	1,830	3,460	4,897	6,280	8,937	14,742	19,342	22,543
Share capital	£374	£806	£1,540	£2,440	£3,646	£6,356	£8,409	£10,186	£13,549	£20,358	£26,017	£30,514
Crops marketed (standard bags)	—	16,354	18,569	30,607	26,813	105,309	111,590	64,992	64,856	120,307	297,244	381,085
Cotton marketed (woolpacks)	—	—	—	21	15	527	952	1,771	3,112	7,881	10,576	15,554
Cash handled	£421	£31,478	£35,077	£55,580	£71,987	£220,529	£253,140	£202,058	£316,483	£629,466	£922,322	£1,142,267
Reserve fund	—	£106	£147	£401	£569	£2,026	£3,757	£4,814	£5,551	£7,910	£12,788	£13,942
Sacks issued	—	17,848	20,897	31,532	27,532	106,377	120,933	77,101	66,500	171,352	300,409	513,133
Value of fertilizer purchased	—	—	£2,160	£7,314	£7,849	£13,607	£7,593	£7,463	£48,168	£111,672	£119,037	£116,719
Value of seed purchased	—	—	£292	£2,486	£4,672	£5,673	£4,493	£4,735	£10,790	£21,100	£22,066	£19,446
Value of agricultural equipment purchased	—	—	£88	£512	£4,586	£18,335	£23,346	£18,822	£41,569	£52,675	£29,669	£34,808
Livestock marketed (head)	—	—	—	—	—	—	—	—	112	1,859	1,192	1,723

ANNEXURE "B'

EUROPEAN CO-OPERATIVE SOCIETIES REGISTERED UNDER CHAPTER 225
FOR MARKETING AND AGRICULTURAL ACTIVITIES

	1964	1965	1966	1967
Registered societies in operation	5	9	11	11
Membership	189	332	480	577
Share capital	£465	£2,599	£4,242	£5,768
Cash handling	£120,376	£178,722	£186,889	£262,389

ANNEXURE "C"

CO-OPERATIVE SOCIETIES REGISTERED UNDER CHAPTER 225
FOR PURPOSES OTHER THAN FOR MARKETING

	1959	1960	1961	1962	1963	1964	1965	1966	1967
Registered societies in operation	2	3	2	3	5	5	7	8	8
Membership	342	523	91	111	309	213	340	528	864
Share capital	£9,171	£10,845	£9,550	£11,632	£38,864	£37,036	£35,901	£34,955	£37,774

Annexure "D"

GOVERNMENT STAFF OF THE CO-OPERATIVES AND LOANS BRANCH

Head Office

European

1 Registrar of Co-operative Societies and Companies
1 Deputy Registrar of Co-operative Societies
1 Assistant Registrar of Co-operative Societies
1 Inspector of Co-operatives
1 Administrative Officer
1 Administrative Assistant
1 Stenographer (female)
2 Clerks (female)

African

1 Office Orderly

Provinces

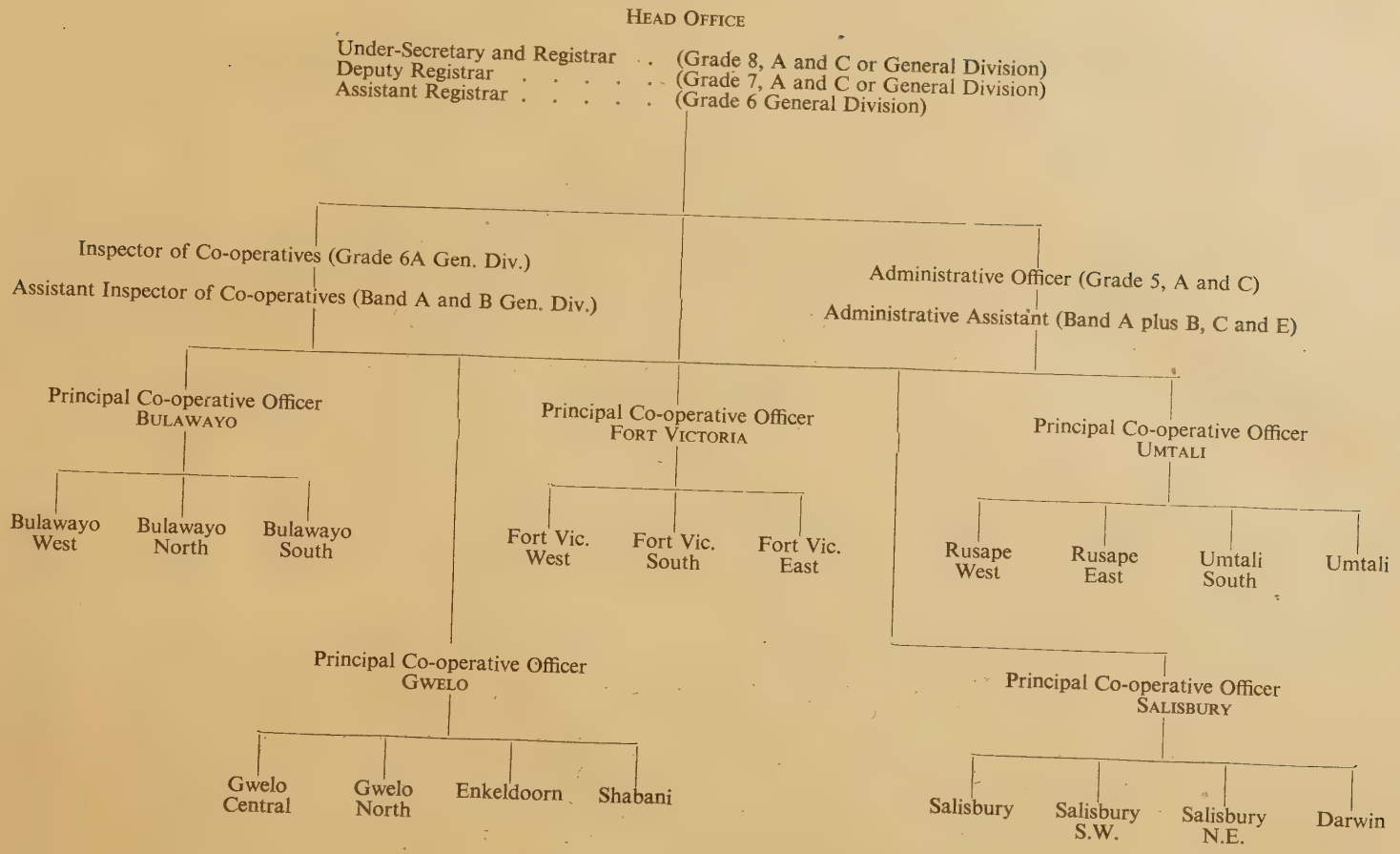
European

5 Principal Co-operative Officers
18 Co-operative Officers
2 Assistant Co-operative Officers
14 Clerks (female)

African

8 Assistant Co-operative Officers
68 Co-operative Assistants
4 Office Orderlies

CO-OPERATIVES AND LOANS BRANCH
MINISTRY OF AGRICULTURE
AS AT 1st JANUARY, 1968


HEAD OFFICE
Under-Secretary and Registrar . . (Grade 8, A and C or General Division)
Deputy Registrar . . . . . (Grade 7, A and C or General Division)
Assistant Registrar . . . . . (Grade 6 General Division)
Inspector of Co-operatives (Grade 6A Gen. Div.)
Assistant Inspector of Co-operatives (Band A and B Gen. Div.)
Administrative Officer (Grade 5, A and C)
Administrative Assistant (Band A plus B, C and E)
Principal Co-operative Officer BULAWAYO
Bulawayo West
Bulawayo North
Bulawayo South
Principal Co-operative Officer FORT VICTORIA
Fort Vic. West
Fort Vic. South
Fort Vic. East
Principal Co-operative Officer UMTALI
Rusape West
Rusape East
Umtali South
Umtali
Principal Co-operative Officer GWELO
Gwelo Central
Gwelo North
Enkeldoorn
Shabani
Principal Co-operative Officer SALISBURY
Salisbury
Salisbury S.W.
Salisbury N.E.
Darwin

1. Principal Co-operative Officers (Grade 6A General Division)
2. Co-operative Officers (Grade 5A plus B General Division)
3. Assistant Co-operative Officers (Band A plus B General Division)

Department of Research and Specialist Services Report

for the period 1st October, 1966, to 30th September, 1967

The year under review was successful. Specialist services were maintained at a high level. Research programmes were expanded particularly in relation to the policies of diversification in agricultural production.

Active discussions continued on the organization of agricultural research and conditions of service in the department. Dr. du Plessis, Chief Director of Agricultural Technical Policy in the Republic of South Africa was invited to visit Rhodesia and to advise the Ministry on the organization of agricultural research. Further improvements in the conditions of service are confidently expected in the new year. This should lead to much more attractive career prospects for professional and technical staff in the Ministry based on merit promotion. Proposals for the re-organization of the department into certain major divisions should lead to better co-ordination of research.

During the year it became known that the break-up of the Agricultural Research Council was inevitable, and proposals were immediately formulated for the absorption of the important Rhodesian-based teams into this department.

Government agreed as a matter of urgency to provide the necessary funds and increase in establishment, so that within a week of the formal announcement of the dissolution of the Agricultural Research Council it was possible to make offers of employment to 25 members of the staff of the Agricultural Research Council, as well as 16 junior field staff. This means that the work of the Soil Productivity, Cotton Pest and Biometrics teams will continue with the same aims and objectives as before.

The Soil Productivity Laboratory under Dr. Grant will join the Branch of Chemistry and Soil Science on the 1st October, 1967 and three professional officers in chemistry; one in soil physics; one in soil microbiology will remain together with four technical and three junior staff.

Since most of the professional staff of the Cotton Pest Research Team will be joining the new Malawi Agricultural Research Council, two additional entomologists have been recruited and arrangements have been made with the Department of Agricultural Technical Services in South Africa for the secondment of a senior entomologist to lead the new Rhodesian team, which will join the Branch of Plant Protection on 1st October, 1967.

The Biometrics team under Mr. Mills will be incorporated into the Department as a new branch at the end of the year and will have an establishment of seven professional and technical officers.

The Microfiche services will be continued by Mrs. Mainwaring who joins the Ministry as Librarian and the Research Journal will also continue under the aegis of the Ministry of Agriculture. The Research Journal will revert at the end of the year to its original title, that is the Rhodesian Journal of Agricultural Research, and will be under the control of an editorial board of wide representation, consisting of prominent scientists from this Department, the University, the Tobacco Research Board and scientific bodies in Rhodesia. The Editor will be Dr. B. S. Ellis, a former Director of Research and Specialist Services. The Tsetse Biology and Chemosterilization unit will continue to operate under the aegis of the University College of Rhodesia and the Hydrology Research unit will be absorbed by the Ministry of Water Development. The research officer from the Bush Control team will join the Department of Research and Specialist Services as a Crop Ecologist.

The first year of the new three-year in-service training course for technical officers was successfully completed. The course covers a wide range of subjects and is specially designed to provide serving officers with the opportunity of improving their knowledge and where appropriate to obtain additional qualifications. The courses proved very popular and several officers participated and passed various examinations in different subjects.

In the Agricultural Education field further investigations were made in connexion with the possible establishment of additional agricultural training facilities. Negotiations are in progress with the Ministry of Education for the transfer of responsibility for agricultural training at Msingwane School to the Department of Research and Specialist Services.

Expansion plans have been formulated for Gwebi Agricultural College to meet the increase

which has occurred in applications for places at the College. These plans include the provision of irrigation facilities if it should prove possible to proceed with the construction of a dam on the Gwebi River. Neighbouring farmers and the Ministry of Water Development are studying the possibility of implementing such a scheme.

The Department's development plans proceeded smoothly. The new Research Station at Chiredzi was officially opened by the Minister of Agriculture, the Hon. G. W. Rudland, in June, and he also spoke at an Open Day at the Salisbury Research Station in April where a large number of guests were invited to see the many new buildings recently completed. The new hostel, lecture theatre and other facilities at Chibero Agricultural College were declared open by Mr. J. C. Graylin on the occasion of Diploma Day in April.

Vigorous action continues to be taken to fill existing vacancies. The bursary scheme is beginning to show results and a number of students are nearing completion of their studies.

The Director and Assistant Director (Specialist Services) visited South African Universities in the second half of 1967 with a view to recruitment and to meet the bursary students. Considerable interest was shown in opportunities in Rhodesia, but to be effective and to sustain interest such visits should be made each year.

Although it appears that a good flow of new graduates will be maintained it is still proving difficult to obtain the services of experienced research workers for certain positions. There is a world-wide shortage of such men. The Department still has an urgent need for more experienced workers in plant breeding, plant pathology and certain other highly specialized fields.

The Directorate and certain senior officers continued to serve on a large number of Standing Liaison Committees and Working Parties.

Study tours and visits to conferences or research organizations outside Rhodesia were made to maintain contact with scientists and research work in other countries.

ANIMAL HUSBANDRY

The past year was a favourable one, and one which brought much relief, particularly to those producers who during the three preceding years of drought suffered heavy stock losses.

The rains came early and continued until late in the autumn. This resulted in excellent grass growth and with the reduction which had occurred in stock numbers the veld had a good opportunity to, and did in fact, recover well above expectations from the effects of previous years of misuse and those of drought.

There was a keen demand for cattle both from farmers in Matabeleland for restocking their farms and from producers in Mashonaland where the shift in emphasis from tobacco to cattle production continued. This had a very pronounced inflationary effect on cattle prices and breeding and young stock in particular sold at a premium.

The Beef Industry

During the period under review the number of European-owned cattle increased from 1,630,606 in 1965 to 1,683,210 in 1966, an increase of some 52,604 head. Over the same period the number of African-owned cattle remained fairly stationary and increased only slightly from 1,844,000 to 1,861,000 head. An examination of the available statistics show that the increase recorded in the number of European-owned stock may be attributed mainly to an increase in the number of cows from 578,541 in 1965 to 606,803 in 1966; the slaughter statistics show that this increase was attained almost entirely through a reduction in a number of cows culled for slaughter.

Similarly, the supplies of slaughter and young stock offered for sale from the Tribal Trust areas was down on last year's figures. As a result the total number of cattle slaughtered by the Cold Storage Commission and private butchers was well below last year's record kill where slaughterings were excessively high owing to drought conditions. However slaughter stock were appreciably heavier on average than those killed last year and despite a slight tightening up of the grading standards there was an increase in the number of cattle slaughtered in the top three grades.

Sheep

The demand for sheep by farmers continued and during the year under review the number of European-owned sheep increased to 244,970 from 216,549 head the previous year. Over the same period the number of African-owned sheep increased from 182,000 to 214,506 head. The number of sheep slaughtered by the Cold Storage Commission dropped, contrary to expectations.

On the other hand butcher slaughterings increased from 26,129 head to 48,441 head.

Last year it was reported that the Cold Storage Commission offered to increase their prices for lamb and mutton on a seasonal basis and the drop recorded in their slaughterings probably may be ascribed to the fact that European producers are still in the process of changing their systems of production to take advantage of the high prices offered for sheep in the off season. It may, therefore, be anticipated that producers will start selling stock in increased numbers towards the end of the year which will only be reflected in the next financial period.

Pigs

Following warnings from the Pig Industry Board that producers should be careful not to over-produce in pigs, the rate of increase which was evidenced in pig production in 1966 slowed down very considerably and during the past 12 months the number of European-owned pigs actually dropped from 71,500 in 1965 to 68,316 in 1966. On the other hand African pig production showed a satisfactory recovery from the setback it received from the drought and their pig numbers increased from 51,000 in 1965 to 71,000 in 1966.

With the drop which did occur in the number of slaughter cattle no undue problems were experienced in the disposal of pig meats, despite a slight increase in the number of pigs slaughtered. During the period under review the number of pigs slaughtered by Messrs. Colcom increased while the number of butcher slaughterings remained constant.

After several years of experimentation a modified system of C & K grading was introduced for baconers. The prices attached to the new grades were calculated to give producers the same pay out as under the old grading system.

Chinchillas

Herd improvement programmes are now getting well established and ranchers have a complete guidance programme with breeding records and charts showing individual ranchers attainments of progress yearly. The set of recording papers are:

Polygamous mating charts showing individual animal assessment, production, performance and progeny testing sections.

A condensed assessment sheet for pelt value and sections to differentiate the animal suitable for use as a breeder.

Herd assessment and quality analysis sheets.

A daily production log with a pelt sale analysis section going up to the minute information on all aspects of the breeding, production and value of pelts produced.

Cardex system of pedigree, and full pertinent information of each individual animal showing immediately by coloured signals, production, offspring data, etc.

Seven articles were issued to all ranchers and a small library is now being established.

Marketing problems have been vigorously and successfully tackled.

The formation of a National Chinchilla Council using secretrial services provided by the Rhodesia National Farmers' Union, took place and an approach is to be made to Government for the registration of all chinchilla owners. Discussions are to come forward on the introduction of standards for pelts and for the sale of chinchillas as breeding stock during 1968.

DAIRY

Good rains were experienced in most areas, and were a welcome relief particularly in those areas subject to the severe drought of the 1964-65 season. However, it will take a few seasons to recover from the damage inflicted in 1964-65 and in Matabeleland recent experiences may even deter normal milk expansion in that area.

In spite of the setback in Matabeleland, milk production continued to increase, but was barely adequate to meet domestic needs towards the end of the season. The difficulties of the Dairy Marketing Board were accentuated by their very successful sales promotion campaign particularly of the sales of whole milk for liquid consumption. The reversal of whole milk sales trends over the past few years was a very encouraging feature and if this continues it augers well for the future of the dairy industry.

Although producers have welcomed the improvement in whole milk sales, they still fear the possibility of decreased producer prices which could arise if a higher proportion of increased intake was channelled into manufacture. Extensive discussions have taken place on this subject and control measures in the form of a milk quota

scheme has been actively considered. The final position is expected to be resolved in the near future.

The requirements of the local market for cheese and butter was met and quality standards were maintained. Ninety-three point six per cent. of the Cheddar Cheese and 91.0 per cent. of butter manufactured qualified for first grade quality.

The number of participants in the Milk Recording Scheme continued at the same level, and a steady improvement in average lactation yields continued. Average production per cow increased from 7,225 lb. in 1964-65 to 7,305 lb. in 1966. As profitability and yield are closely linked it is gratifying to see this improvement but on the other hand there is plenty of room for improvement. The good levels of production achieved by our leading dairymen in all areas, provide evidence of the potential which our dairy stock are capable of achieving under our climatic conditions.

The twice monthly testing of all farm milk supplied to the Dairy Marketing Board continued. This scheme was introduced to improve hygienic and compositional quality, and in so far as hygienic quality is concerned has been very effective. During the year under review 84.4 per cent. of supplies examined satisfied official methylene blue test standards, an achievement which is worthy of praise. Progress on compositional quality has unfortunately lagged and although seasonal variations can be expected it is disturbing to see the fall in quality which regularly prevails towards the end of the winter period. Regular calving throughout the season and improvement of the plane of nutrition during the winter period would improve the position. Such a policy, if followed, would not only improve quality but could be responsible for increased lactation yields.

Steady progress has been achieved in the development of our bacteriological and chemical laboratory services. Quality control of milk and milk products is increasing and extending in scope and receives active support from producers and commercial interests. Grading of cheese varieties other than Cheddar has also been introduced and both services are expected to stimulate interest, promote discussion, and help in achieving higher levels of efficiency in our dairy industry.

Officers of the branch have continued to lecture at Gwebi and Chibero Agricultural Colleges and also to assist in the training schemes launched during the year by the Dairy Marketing Board for the training of new recruits.

POULTRY

Marketing conditions in the egg industry stabilized and a general price increase occurred in both Salisbury and Bulawayo. This reflects a slight reduction in egg production and a levelling of the flush supply.

Although broiler prices have fallen further, production has increased by some 37 per cent.

Producer registrations continue and are of great value, both in control of product quality and for the collection of statistics. A further 12 to 18 months is still required before various anomalies are settled. Improved surveillance of producer returns is required.

The number of breeders remained static during the year. Chick sales have increased over the previous year to a favourable extent.

Feedstuffs containing much fish meal have fallen slightly in price. The use of home grown maize is increasingly a prerequisite for large-scale broiler production.

African poultry producers have increased their efforts in both sectors of the markets. Registration has brought several large African producers to light.

Research

Despite difficulties in continuity arising from two complete changes of staff since 1965 research at Gwebi has steadily expanded since all poultry work was consolidated there in 1966. This includes work carried out in collaboration with the University College.

The framework of a longer term research programme is under consideration. All breeding work except for student demonstration ceased two years ago.

Nutritional and economic investigations form the basis for future work. Experimentation relates to layers and broilers specifically, with at most, a few trials on other species. As layer experiments are longer term than broiler work, more detailed information is sought, as a sideline, from the Random Sample laying test.

Assistance from the industry and the feed merchants has been solicited in formulating the programme. Environmental conditions are also under

consideration, with the collection of preliminary temperature and humidity records.

The 1967 programme included an extensive protein phase feeding experiment with hybrid layers, this was a second run after heavy mortality upset the first phase.

No marked trends have appeared as the work is incomplete. Two feed additive trials were undertaken, one on carotenoids on yolk colouration and another with I.C.I. 33828 in an attempt to delay maturity, this proved unsuccessful.

The new 12-bay brooder house has extended broiler work considerably. When "E" house is refloored, even larger factorial designs will be possible. Broiler trials will continue in the 13 ex-brooder pens until recently used for test birds.

The following broiler work took place.

Part one of a three-phase evaluation of Rhodesian broiler nutrition. This will include carcase and energy balance work related to energy, protein and optimum combinations of the two factors. The energy phase is complete.

A trial commissioned by the Rhodesian Milling Co. (Pvt.) Ltd. on broiler phase feeding and animo-acid additives proved negative.

Least cost linear programmed rations were studied in two trials, the results to be utilized in a full experiment comparing such rations with commercial formulations.

Research is under way on broilers to study the utilization of cotton seed meal to replace groundnut meal as the national surplus of cotton seed increases.

Random Sample Laying Trial

The third trial terminated in January, whilst the leading results were good, there was considerable criticism of the test over the high mortality. Some pens lost over 50 per cent. of the sample. Chicks for the current and future tests are to be reared separately.

The current test is nearing completion, several top pens results are excellent but the lower half are very poor.

Birds growing out for the fifth test are making excellent progress with low mortality.

A graphical presentation of the first four Random sample trials has been prepared for consideration by the breeders.

Other Branch Activities

After successful completion of the registration and grading regulations for poultry products, more time has been available for extension and some 50 visits were paid to producers during the year.

Although visits were mainly confined to the Salisbury area—the majority of producers are centred here. Market inspection and show judging tours to other centres allowed a fairly wide national coverage. Such visits increased in frequency during the head office post take-over period

Mr. G. H. Cooper, the Chief Poultry Officer, who officially retired in 1964, continued to serve in an acting capacity pending the appointment of Mr. R. M. Mowbray who returned from specialist studies in the United Kingdom in July.

Branch interest has continued in stock feed registrations. Poultry club work has been supported in both the main centres.

PASTURE RESEARCH

Apart from general observations, this report is confined to the activities of the Headquarters Staff on the Pasture Branch. The work of the Branch on the Research Stations is dealt with in the Station Reports.

Veld Grazing

Over most of the country the late rains of the 1965-66 season were followed by a good rainy season in 1966-67. This has resulted in a great improvement in veld condition throughout Rhodesia.

In the south and south-western lowveld, particularly hard hit by the drought, the effect of the good season assisted by a considerable reduction in stock numbers and grazing pressure brought about by drought deaths and drought relief destocking, was marked by a spectacular flush of annual grasses which now cover land which was almost completely denuded.

This annual cover represents an early stage in the recovery succession, but if it is to be the first stage in the recovery of the lowveld and not a purely temporary improvement, depends very largely on how it is treated during the coming and following rainy season.

Unfortunately the breaking of the drought appears to have induced a sense of complacency which has taken the heat out of the former

urgency to do something to avert what was generally recognized as an impending calamity, the complete collapse of the lowveld grazing land.

What needs to be done is spelt out step by step in the report of the Committee for the Use of Marginal Lands in Rhodesia. It is extremely important that steps should now be taken to implement the recommendations made in that report. Time is not on our side in this matter and the longer action is deferred the more difficult will it be to remedy the situation.

Surveys

Extensive surveys involving studies of condition and trend in the vegetation and advice on improved land use and management have been undertaken for the Natural Resources Board and the Department of Conservation and Extension in the National Land in the Tuli Circle and Mana Pools areas and in European and Tribal Trust Land in Southern Matabeleland as well as on Nuanetsi Ranch, on Triangle Estates Ltd., and on four Cold Storage Commission ranches in the Fort Victoria District.

Surveys for the Department of National Parks and Wild Life Management were made in the Robert McIlwaine National Park, in the Lake Kyle National Park, in the Wankie National Park, in the Gonakudzingwa area and in the Mana Pools Game Reserve.

In Mashonaland a survey of the distribution and importance of *Lopholaena corriifolia* was made because of an application to have this plant proclaimed a noxious weed. It was decided that this step was not warranted and would serve no useful purpose.

Studies in the nature of the vegetation in certain selected areas were continued as opportunity offered.

Extension and Training

The branch continues to be responsible for teaching Veld Management and Pasture as a subject to the students of the Gwebi College of Agriculture.

Lectures on Veld and Pasture Management were delivered at meetings of intensive conservation areas and farmers' associations at Melsetter, Headlands, Makoholi, Fort Victoria, Mushandige, Tengwe, Sinoia and Makwiro.

Assistance was given to the Department of Conservation and Extension in intensive conservation area tours and field demonstrations in the Melsetter, Victoria East, Mushandige, Norton and Umboe areas, and to the Department of National Parks and Wild Life Management by means of lectures and field demonstrations at its first annual in-service training course held in the Kyle National Park. In addition the Branch served on eight departmental and inter-departmental Committees, published a number of papers and were responsible for numerous unpublished reports.

Established Pastures

The first annotated list of *Recommended Varieties of Pasture Grasses and Legumes* was published in the *Rhodesia Agricultural Journal*, the *Rhodesian Farmer* and in *Modern Farming*.

Visits to other Countries

The Chief Pasture Research Officer, who is the Standing Committee for Bush Control of SARCCUS (one member Standing Committee) attended the 10th Ordinary Meeting of SARCCUS in Angola in October, 1966. He visited the S.I.S. Ranch of C.D.C. in Swaziland in March, 1967, to advise on Veld Management and Bush Control.

HORTICULTURE

This was a year of extremes. Dry conditions were extended due to the late onset of the rains and summer temperatures were higher than usual. The rains continued until May, the latest for some years. There followed a mild winter, cloudy skies for three weeks being an unusual occurrence. Such atypical conditions had a marked effect on crops and fruit trees.

Production and Marketing

Considerable expansion of horticultural production occurred in all sections of the industry. The country is now at a higher level of self-sufficiency than ever before and this should continue.

By improved extension services to farmers and growers, higher standards of crop production have been attained with consequent increased yields. A wider spread of marketing was also achieved.

Peach, plum and apple crops were below normal due to the very mild winter and a late frost in August. Thus there was quite a shortage of canning peaches for the processors and there was a sellers' market particularly for apples.

Vegetable supplies increased considerably throughout the season and onions reached an all-time high. There was no shortage of any vegetables during the year.

Currency restrictions precluded importation of the vegetables and this opened the home market to local producers. More processing took place.

Both tea and coffee expansion and cropping continued. The green-leaf tea scheme is working favourably.

Main Activities

So many requests were received for specialized information over an extremely wide field of horticultural crops and pursuits and callers for consultations that these duties occupied the major part of the year. The bulk of this work by far concerned fruit and vegetable production, cultural aspects, storage, marketing and processing.

Much time was devoted to the training in turn, of three new horticulturists for the Department of Conservation and Extension. This has resulted in the team of horticulturists in this Ministry now being stronger and a far more effective force than ever before. More experience will be achieved in due course with added maturity.

Some cut-back in field work from Head Office became necessary owing to heavy office commitments, and officers being away on courses. Advisory visits, lectures, demonstrations of pruning fruit trees, horticultural show judging, technical talks, departmental and outside meetings were carried out.

Investigations and Achievements

Close liaison was maintained with the Henderson Research Station staff responsible for vegetable, viticultural and tree fruit investigations. Much progress was made with the introduction of new varieties. The Chief Horticulturist continued as a member of both the Growers Liaison Committee and the Research Committee of the Rhodes Inyanga Experiment Station.

Technical information was supplied to a number of different Government Branches and Departments. Close contact was maintained with the Branch of Economics and Markets, fresh produce auction markets, also the inspection service connected with the National Mark scheme.

Various pamphlets for distribution and the horticultural journal *Hortus* was produced half-yearly. Information for press release and technical matter for agricultural correspondence, were supplied.

BOTANY

At the end of May, 1966, the Chief Botanist, Dr. Wild, left the Herbarium after nearly 21 years in the Branch of Botany to take his appointment to the Chair of Plant Science at the University College of Rhodesia. The Herbarium will feel his loss for some time, but his knowledge and experience will not be lost to Rhodesia. He hopes to continue his interest and active participation in research for the Flora Zambesiaca and as an honorary editor of *Kirkia*.

Accessions totalling 6,700 were made during the year which was rather less than when the Herbarium undertook an identification service for the whole of South Tropical Africa. Over 3,000 specimens were received from Rhodesian Government Departments, whereas only 1,800 were received from Zambia and 158 from Malawi and Botswana.

Mr. Drummond accompanied the Bechuanaland Mammal Survey to the Lake Ngami area and the Khwebe Hills. A collection of some 400 numbers was made. This area has not been visited by a botanist since 1897-1898, when a collection was made by Major and Mrs. Lugard. Other profitable collections were made in the Chimanimanis and on the Rhodesian shore of Lake Kariba and the Zambezi Valley.

Dr. Wild actively pursued his investigations into the flora of the copper impregnated soils associated with copper workings in Rhodesia.

Flora Zambesiaca, Vol. 2, Part 2, appeared in March, 1966. Other parts which will appear in the near future are the Mimosoideae volume being prepared at Kew, and Fern volume being prepared by Dr. Schelp in Cape Town and the first Gramineae volume being prepared at the British Museum. Dr. Wild continued his work on the Compositae, while Mr. Drummond continued to work on the Rubiaceae and Mr. Simon on *Sacciolepis* and *Setaria* for the *Flora Zambesiaca*. Financial arrangements have been made for the printing of the Flora Zambesiaca vegetation map produced by Professor H. Wild and Professor L. A. G. Barbosa.

Mr. Simon has become proficient at the determination of grasses and has produced provisional checklists of Rhodesian and Zambian grasses.

Mr. Dale, the Economic Botanist, has been gradually taking over most of the general economic

advisory work. He has also undertaken a random collection of indigenous species to be sent to a drug firm in the U.S.A. for analysis for alkaloids.

Collaboration continued with the Veterinary Department, Government Analyst and British South Africa Police in the determination of poisonous plants.

Considerable progress has been made in making the Botanic Garden more park-like, by removal of rocks, grass planting, etc. Wrought iron gates have been fixed to the main entrance. Over 800 specimens of trees and shrubs were planted, mainly in the indigenous sections. Over 400 species of woody plants (mainly trees) indigenous to Rhodesia are now grown in the Botanic Garden.

Major projects which have been undertaken during the year are as follows:

The production of a publication on African plant names to take the place of H. Wild's *A Southern Rhodesian Botanical Dictionary of Native and English Plant Names,* which has for 10 years been a field workers' vade-mecum. This work is now out of date and almost out of print.

A check list of all Rhodesian plants is being prepared family by family. It is not intended for publication, at least not in the first instance, but that cyclostyled copies should be circulated to interested people.

The production of a comprehensive book on poisonous plants in Rhodesia is being undertaken in collaboration with various members of the Veterinary Department.

A book on weeds is being considered to replace the publication *Common Rhodesian Weeds* by H. Wild. The scope of this will depend on the form taken by the S. African weed book which is in the press at the moment.

These (and other minor projects such as the revision of the Chimanimani checklist and preparation of a checklist of woody plants of Rhodesia) are necessarily long term projects and, in any case, take second place to the preparation of the *Flora Zambesiaca* and the maintenance of the identification service and maintenance of the Herbarium.

PLANT PROTECTION

General

During the year work was completed on the new purity laboratory and germination block in the Seed Services section. A new "wormery" for Nematology was commenced and is now almost complete. The plant quarantine reception laboratory is similarly almost completed but delays have occurred in the construction of the new quarantine greenhouse.

Entomology

During the first quarter of 1967 outbreaks of armyworm occurred in Marandellas and Salisbury. In the Midlands there was a serious outbreak of American bollworm on sorghums, and on maize in the Salisbury area.

A study was commenced on the interrelationships and biology of the parasites of citrus psylla (*Trioza erytreae*) in order to determine whether integrated control of this pest is possible.

Investigations into the control of seed-corn maggot (*Hylemyia cilicrura*) were commenced at Salisbury. This insect attacks cereals; and for the first time was found damaging soyabeans in Rhodesia. Control of this pest is important where a soyabean-cereal rotation is practised.

Studies on the biological control of potato tuber moth have been commenced and a polyembryonic egg parasite (*Copidosoma koehleri*) has been introduced from South Africa. The parasite has been released onto the farms of three potato growers in Mashonaland. Ecological investigations on field populations of tuber moth have revealed the presence of wild host plants and have given information on the times of peak emergences of the moth.

A consignment of 550 pupae of both sexes of the maize stalk borer was dispatched to the Tropical Products Institute in London for the purpose of carrying out test trapping runs. The results of these tests confirm that a fairly strong sex attractant is emitted by the virgin female moth. A keen interest is being shown by the T.P.I. in this work and it is hoped to be able to send crude female extracts and live males to London during the coming season.

Breeding of the five economically important species of cutworms in the laboratory has enabled a classificatory key to be constructed.

With the tobacco industry showing an interest in using polythene sheeting for packing purposes, work was commenced to determine the ability of the tobacco beetle to penetrate polythene sheeting of various gauges.

Nematology

The work for the year included the handling of approximately 182 inquiries and 154 specimens, continuation of soil fumigation trials for the control of plant parasitic nematodes, the survival of root-knot nematodes when fed to a bovine, and the hot water treatment of grape vine roots for nematode control.

It was found that the immersion of grape vine roots in water at a temperature of 125°F. for five minutes, followed by a cold water plunge did *not* effectively control the infection of *Meloidogyne javanica* within the roots.

A peach orchard in the Rusape area, heavily infected with *M. javanica* was treated with Nemagon and ethylene dibromide in 1966. Yields of peaches from individual trees are being recorded annually.

There is considered to be an apple tree establishment problem at Rhodes Inyanga Orchards. An endoparasitic nematode *Pratylenchus* (possibly *penetrans*) has been found causing a considerable degree of root rot in the orchards. A large scale experiment has been initiated, one of the treatments being soil fumigation with dichloropropene.

Investigations are continuing at the Mazoe Citrus Estate to determine whether the citrus nematode (*Tylenchus semipenetrans*) is a contributary factor in the poor establishment of trees. Soil treatments using Nemagon and ethylene dibromide were carried out in 1966 and yields of fruit from individual trees are being recorded annually.

Experiments on soil fumigant placement were carried out in Rusape on a tobacco land which was heavily infected with *M. javanica*. Results indicated that deep placement (two feet) of ethylene dibromide resulted in a lower Root Gall Index particularly on the lower roots.

It has been demonstrated that when potato tubers infested with *Meloidogyne arenaria* are fed to a bovine a low percentage of the nematodes can survive passage through the digestive tract and remain infective.

Plant Pathology

The number of disease specimens submitted for examination totalled 614 and included the following new disease or host records of potential economic importance:

anthracnose of soyabean due to *Colletotrichum glycine*, anthracnose of cotton (*Glomerella gossypii*), black spot of pear (*Fabraea maculata*), fruit rot of pepper (*Phytophthora parasitica*) and root rot of macadamia (*Armillaria mellea*).

Investigations on Diplodia cob rot of maize revealed that infection does not normally occur before the silks start to die off and that the cobs are most susceptible to infection at the milky stage.

No evidence of seed transmission of downy mildew in sorghums was obtained. There was an unusually high incidence of ergot in sorghum crops but feeding tests carried out by the Veterinary Department indicated that no ill effects are likely to result from the consumption of such contaminated grain.

Results from a series of annual spray trials carried out at Salisbury on groundnuts against Cercospora leaf spot indicated that fungicide applications are only likely to be worthwhile on early planted crops of susceptible varieties.

Serious losses in summer plantings of potatoes were caused by late blight, and attacks by this disease continued throughout the winter, even as late as September in some localities. Daconil, zinc-maneb, and fentin hydroxide gave a similar degree of late blight control but fentin hydroxide was sometimes phytotoxic. Relatively poor control was obtained with fentin acetate.

Local interest in the use of the exocortis sensitive trifoliate orange and citrange rootstocks as alternatives to the currently used rough lemon rootstock, which is resistant to this virus, prompted investigations on methods of virus indexing of mother trees intended as sources of budwood. A rapid method, originally developed in California, using sensitive clones of Etrog citron, has given consistently reliable results in local tests.

Infection by stem rust in wheat occurred relatively late in the winter irrigated crop. A few localized severe outbreaks occurred but in general the reduction in yield caused by this disease was low.

Seed Services

The total number of samples for testing showed an increase of 168 on the previous year.

The following figures indicate the number of samples received for different kinds of seeds:

Legumes	*Vegetabes*	*Tobacco*	*Grasses*	*Cereals*	*Others*	*Total*
750	685	203	167	711	151	2,667

As part of an organized referee testing programme in preparation for the International Seed Testing Association Congress in New Zealand during 1968, this laboratory received, and in turn, sent several samples of seed to various countries.

Apart from routine analysis, work on the viability of different crop and weed seeds was expanded to include a greater range of crop and weed species.

The total acreage inspected for certification or export purposes showed an increase of 336 acres on the previous year. The acreage inspected for the various crops were as follows:

Horticultural and Crop Seeds	*Pasture Seed*	*Seed Potatoes*	*Tobacco Seed*	*Total*
6,280	1,363	763	15	8,421

With the trend towards greater crop diversification in Rhodesia, producers established larger acreages of certain crops to meet increased demand for good quality seed.

The promulgation of the new Seed Regulations due for publication during the early part of 1967, was again delayed for further revision and the Regulations are now due to be gazetted in early 1968.

Plant and fruit inspections were carried out at all stations and total traffic showed an increase in the number of consignments handled compared with the previous year. Only a small proportion of the fruit submitted for inspection under the National Mark failed to reach the quality laid down under the Regulations.

CHEMISTRY AND SOIL SCIENCE

It is gratifying to record an increased use of the soil advisory service following the sharp decline in the previous two years. Advisory reports issued have increased by 25 per cent. and soil samples analysed by 18 per cent. While tobacco recommendations have understandably decreased further (8 per cent.), maize and cotton have increased markedly (39 per cent. and 37 per cent. respectively), and there has also been a marked increase in requests for alternative recommendations for other crops, notably groundnuts and soyabeans.

However, the analysis of agricultural materials other than soils has declined by 28 per cent., largely because analyses of feeding materials and animal products are increasingly being undertaken in the laboratories of the major research stations. On the other hand, samples received from non-Government sources continued to increase (21 per cent.). It has been possible to pay considerably more attention to official sampling of registered farm feeds and fertilizers, and 97 such samples have been analysed. Continued expansion of this important function of the Branch is planned.

Unfortunately, the spectrographic laboratory for the diagnosis of nutritional disorders in growing crops has unavoidably remained closed throughout the year, but it should be possible to provide this service again early in 1968.

In collaboration with the Grain Marketing Board, a survey has once more been carried out of the incidence and level of aflatoxin contamination of the national groundnut crop. Preliminary results indicate that for the second season running the level of contamination has been low. In collaboration with the Aflatoxin Research Team of the Department, research has continued on the effects of environmental and cultural factors on the incidence of contamination. A comprehensive computor analysis of results of previous work has been completed.

Soil-chemistry investigations have included work on a suitable laboratory method for determining the availability of zinc in soils, boron trials in collaboration with the fertilizer companies, and long-term co-operative trials in the Eastern Districts to examine the reliability of current analytical methods of assessing soil fertility under high-rainfall conditions.

Close collaboration was maintained with the A.R.C. Soil Productivity Laboratory at Marandellas. With the dissolution of the A.R.C. negotiations were completed for the absorption of the Soil Productivity Team, under Dr. P. M. Grant, as a new section of the Branch of Chemistry and Soil Science, from 1st October, 1967. The work of this team for the year under review is fully reported in the A.R.C. Annual Report.

On the animal-nutrition side an *in-vitro* digestion method for assessing the nutritive value of animal feeds has been developed to the stage where it can confidently be passed to a research station for experimental application. A considerable amount of work has been done on a method for the quantitative separation of the component parts of bovine teeth, preparatory to detailed chemical analysis in connexion with research in progress at Matopos Research Station on differences in the teeth of indigenous and exotic breeds.

Soil-Physics research has centred on various aspects of soil moisture in relation to crop development. Work has continued on the collection of moisture-retention data for representative soils, studies of moisture-withdrawal patterns under different crops, and the effect of different crops on soil-moisture carry-over from one season to the next. A trial to determine the early-season water requirements of groundnuts has indicated the ability of this crop to thrive on infrequent irrigations during early stages of growth and its marked response to early establishment, kernel yields of 24 bags/acre being obtained. Preliminary work on a project to define the type of moisture season to be expected in different climatic zones throughout the country, using a moisture-balance approach, has been undertaken. An investigation of methods of reducing water losses from night-storage dams, using chemical deflocculants, has also been initiated.

Plans are well advanced for the construction of automatic rain shelters to enable detailed work to be carried out during summer on the relationships between soil moisture and plant growth and development, under controlled moisture régimes.

Extensive soil surveys have been carried out to assess the irrigable-soil potential of land adjacent to the Umzingwane and Limpopo rivers and in other parts of the south-western lowveld. Similar surveys of 26 minor irrigation schemes have been undertaken, nine of which are in Tribal Trust Lands.

Work has continued on the mineralogy of the clay fractions of Rhodesian soils and on the effect on the soil of irrigation with lowveld borehole waters of doubtful salinity characteristics. Comprehensive salt-balance studies in collaboration with Triangle Limited have continued and valuable data of wide applicability in the lowveld are being obtained.

BIOMETRY

With the dissolution of the A.R.C., negotiations were completed during the year for the absorption of the A.R.C. Biometrics Team on 1st January, 1968, when a new Biometrics Branch will be created under Mr. Mills as Chief Biometrician.

During the year under review this Department's biometrician continued to be attached to the A.R.C. Biometrics Team whose work is fully reported in the A.R.C. Annual Report. Unfortunately Mr. Heyting left in February but the vacancy was filled in August by Miss Berry. With his departure the work with which he was concerned was taken over in entirety by the A.R.C. Biometrics Team. Mr. Franklin continued to develop the herbicide and PCQ projects, while Mr. Mills took over the other work. Miss Berry has gained experience by working on a range of jobs with the A.R.C. Team.

Advice was given on a wide scale on the planning of experiments, not only for annual crops but additionally for grazing trials, including a comparative study of a short grazing/long rest system with more commonly used management.

Analytical work was mostly concerned with the Point-Centred Quarter Method used for evaluating cover on rangeland. Six grazing trials have been evaluated and it has been found that the Method does enable a real assessment of difference in grass growth to be made. Development of the theoretical model continued with particular relevance to the sampling density required to obtain a desired precision. It is still intended to try multivariate procedures to define the joint distribution of mixed species. The field procedure and method of analysis has been written up in a Departmental publication and a paper for submission to an international journal is being prepared.

Herbicide trials performed at Henderson Research Station were continued and revised designs and techniquies based on the previous years were tested.

Much time was expended on the final detailed analysis of data from the six years of the Bone Meal Supplementation Trial at Makoholi. Another large job was the attempt at a joint evaluation of a series of nitrogen fertilizer trials with maize at Grasslands. Later in the year considerable time was spent in organizing a new series of coffee trials.

A Biometrics Course was designed for the in-service training scheme for Technical Assistants.

SALISBURY RESEARCH STATION

After a completely dry October two inches of rain fell between the 6th and 11th of November, 1966, and a number of maize trials were planted and germinated well. There was, however, less than half an inch in the remaining three weeks of the month; and to save time, which was becoming critical, it eventually became necessary to resort to dry planting. The next germinating rain did not

occur until the 19th December. Before then it became necessary to replant the trial in which the response of maize to varying amounts of nitrogen is measured. Thereafter adequate rains until almost the end of March produced surprisingly good yields considering the lateness of germination.

Maize

The use of hybrid varieties in Rhodesia, entirely a post-war development, has not only been one of the most important contributary factors towards the country's expanding maize crop but, because it requires freshly crossed seed for each crop, has been directly responsible for a new industry. For the planting of the 1966-67 crop over 160,000 pockets (100 lb.) of hybrid seed were sold. The popularity of the more expensive single hybrid seed of SR 52 has added to the industry's importance.

In the variety trials on the Station, SR 52 yielded nearly 3½ bags an acre more than SR 14 and over eight bags an acre more than SR 13. Nevertheless a comparison with the yields from the 1965-66 trials shows that the late date of planting affected the quicker maturing SR 14 least of the three varieties. The performance of certain experimental hybrids has been so promising that it is hoped that it will be possible to combine some of their inbred parents into a double hybrid superior to SR 13.

Whilst yields on the Station were generally somewhat lower than in the previous season those from the national trials conducted in most of the important maize growing areas of the country were a little higher. The mean yields from thirteen trials for the varieties SR 52, SR 13, SR 14 and Southern Cross were 35.04, 31.04, 32.46 and 26.59 bags per acre respectively.

Even though the lowveld summer may not provide ideal conditions for maize production, yields from a wide range of varieties have generally been rather disappointing in the Sabi and Chiredzi areas and it is hoped that better adapted material will eventually be found. This season temperatures were a little lower than normal, and there was an unusual amount of cloudy, overcast weather, and SR 52 yielded as well as any of the quicker maturing varieties in the trial at Triangle.

Wheat

In spite of the severity of the attack of stem rust experienced in the winter of 1966 expansion in wheat production has continued and there is no doubt that the 1967 crop will again be a record. Expansion is likely to continue and may be accelerated by the incentive price of 67s. 6d. per bag now being offered.

There seems little doubt that much of the winter wheat crop has in the past been sown too early and that in many fields this has been responsible or partly responsible, for the severity of the rust attack. A rigid acceptance of the advice not to sow any winter wheat until May should help to reduce the incidence of rust, not only in the individual crops concerned, but also throughout the country as a whole. It does not seem that the planting of summer wheat in December is having any harmful effect on the winter crop.

During the year two new varieties, Umniati and Umtali, were released. These two varieties, together with a further seven yielded over 30 bags an acre in trials on this station.

Fourteen samples of wheat grown during the winter of 1966 were submitted to the Rhodesia Milling Company for tests. The co-operation received from this Company is very gratefully acknowledged; it has been of great value to the Wheat Breeder in helping him to assess the milling and baking qualities of his new material. Of the 14 varieties submitted one of them was found to be the strongest of all wheats yet tested in Rhodesia, two were considered capable of carrying weaker wheats and two were suitable on their own for commercial baker's flour.

Considerable interest has been shown recently in the varieties of wheat developed in Salisbury by visitors from South Africa and it is hoped that some of them will be found useful when they are grown in that country.

Soya Beans

The breeding work progressed as planned. Seed of the first 17 progeny bulks grown at Sabi Valley in the 1966 winter germinated well at Salisbury in the summer and in the 1967 winter 63 progeny bulks were successfully established at Chiredzi Research Station. Thus the feasibility of growing a winter generation in the lowveld has been established. The crossing programme continued with reasonable success and a large number of single plant progeny selected from existing varieties were grown. It has been established that many of the off-types selected have arisen from natural cross-pollination.

In spite of planting very late on December 20th yields in the variety trial were very high. All the highest yields were obtained from early maturing varieties, 10 of which produced over 14 bags an acre with the highest yielder, a selection from Hood, giving 14.9 bags an acre.

Prior to the start of the 1966-67 season seed of a new variety named Rhosa (introduced as 59s143 from South Africa in 1961) was released to the Horticulture and Crops Seed Association. It is hoped that the Association will have bulked up sufficient seed to be able to sell appreciable quantities for the 1968-69 season.

Agronomy trials with different varieties confirmed the desirability of thick stands and close rows for the early maturing seed varieties. Responses to lime were obtained again. The response of the introduced varieties Hill, Geduld, and Rhosa to Rhizobium inoculation was greater than that of Hernon 147 for which the natural Rhizobium strains present in the soils at Salisbury appear to be adequate.

Groundnuts

In contrast to those of Soya beans the yields of groundnuts were low, due no doubt, to the effects of late planting. The highest yield was from Makulu Red which produced 11 bags of kernels an acre in one trial.

Prior to the start of the season seed of a new variety, Valencia R 1, (introduced from East Africa as Valencia Ukiriguru in 1959) was released to the Horticulture and Crops Seed Association for bulking.

A detailed study of a new collection of groundnuts of South American origin was started. Progress was made in amending the present classification devised by Bunting which was found inadequate for this material. A number of the introductions showed evidence of resistance to *Cercospora arachidicola* and many were healthy and prolific. Single plant progeny of pink seeded off-types from Makulu Red were grown by Henderson Research Station and brought to Salisbury for further evaluation. Arrangements have been made for Makoholi Experiment Station to screen Natal Common Strains, beginning in the 1967-68 season, as Salisbury is not suitable for this purpose.

Agronomy trials with different varieties confirmed previous findings that late maturing groundnuts do not respond to populations of more than about 60,000 plants to the acre whereas the yields of early maturing varieties increase as the plant populations are raised to more than 100,000 plants to the acre. Planting early and planting in close rows were found to be beneficial.

Field Beans

Whilst in previous years the field bean varietal trials have been conducted under dry-land conditions, and planted in January or early February, this year 15 varieties were planted early in March and grown with supplementary irrigation. The object was to see whether higher yields were obtainable when planting is delayed sufficiently to reduce the extent to which beans are damaged by disease during wet weather; and, in conjunction with this trial, the effect of an initial application of 30 lb. nitrogen was measured. With the supplementary irrigation most varieties did produce higher yields than in past years, Red Canadian Wonder reaching 11 bags an acre in the presence of nitrogen, but the general level was not as high as had been hoped. Although the seed was inoculated all varieties responded to the application of nitrogen to a greater or lesser extent, the mean response being .93 bags per acre.

Sorghums

After a lapse of 10 years, during which time no sorghums have been grown on the Station, a varietal trial with nine varieties was laid down in co-operation with Matopos Research Station. The trial was dry planted a few days before good rains fell on December 19th and good stands were obtained. Yields were above expectations, the variety Kiowa exceeding 41 bags an acre and several other varieties yielding between 37 and 40 bags.

CHIPINGA EXPERIMENT STATION

Nearly 44 inches of rain fell this season which is four inches above the average for the past 11 years. The distribution pattern was excellent and a mild winter was experienced with no damage caused by frost although it was recorded twice during the year.

A Field Day was held on 4th November, 1966, and was attended by about 140 people. The day was opened by the Minister of Agriculture, the Hon. G. W. Rudland. During the year the Station was pleased to welcome some 317 visitors.

Coffee Research

Early in the year a Coffee Experiment Committee was established under the Chairmanship of the Assistant Director (Specialist Services) and including the representatives of the Rhodesia Coffee Growers' Association, the A.R.C. and departmental officials.

This Committee has reviewed the whole experimental programme; existing experiments have been examined and some have been eliminated whilst several new experiments have been initiated.

The management, variety and artificial shade trials continue and a large scale natural shade trial was commenced to evaluate the effect of shade and of varying degrees of shelter. Within this trial, other experiments such as nitrogen levels and pruning will be tested. Fertilizer trials have been initiated on private estates as well as at Chipinga Experiment Station and a new lime trial is proposed.

Liaison was established and will be maintained with Malawi in the testing of fusarium resistant varieties. The coffee factory is being modernized.

Tea Research

In May a Tea Research Officer, Mr. P. U. Thiran, was appointed and he immediately established liaison with the Tea Research Foundation in Malawi, where he spent a period of study.

The Department of R. & S.S. became a member of the Tea Research Foundation in July and close contact will be maintained with this organization in the planning of research and the dissemination of specialist advice in Rhodesia.

Attention is being given to the initiation of trials of local importance and to the establishment of a tea nursery at Chipinga Experiment Station. Close liaison will be maintained with estates in Rhodesia where field and observation trials are already in progress.

GATOOMA RESEARCH STATION

The total rainfall for the 1966/67 season amounted to between 21.34 and 25.10 inches at different sites on the Station. Planting commenced following good rain on November 8th but there was no follow-up and most dry-land crops had to be replanted following good rain in the second half of December. January and February were wet but little rain fell in March and the season closed with good rain at the end of April and on the 1st May. Relatively warm conditions up to the end of June permitted development of a late crop. Relatively good yields were obtained but the combination of late planting and virtual cessation of rain at the end of February had an adverse effect on cotton maturity.

Cotton Pest Research

During the 1966-67 season the A.R.C. Cotton Pest Research team continued its investigations in Rhodesia, Malawi and Zambia, but with the dissolution of the A.R.C. negotiations were completed for the absorption by the Department of Research and Specialist Services of the work of the team on 1st October, 1967. The work will continue at Gatooma, but the new staff concerned will be attached to the Plant Protection Branch.

The work of the team for the year under review is fully reported in the A.R.C. Annual Report.

Diparopsis castanea the Red bollworm continued to be the focus of detailed study. The long-term investigation of its physiology and behaviour with special reference to diapause made considerable progress with the development of various new techniques. Many of the experiments now being initiated will, however, take a year or more before they are finished. In London, the work on chemosterilization of the male moths which started at Gatooma, was continued. A massive collection programme in Malawi yielded some 150,000 Red Bollworm pupae which were sent to the Tropical Products Institute for work on the analysis of the sex attractant. Extracts from various stages in the purification of this material were sent to Gatooma and tested in the field. Work at Gatooma was continued with particular emphasis on the search for a bioassay technique.

A survey of Bollworm Egg levels throughout the season was made on each of 25 farms in the Salima area, and 32 farms in the Lower River area of Malawi. The main purpose of the survey was to determine the size of sample necessary to give spraying instruction in any one "scouting zone". It is intended that this study should continue on the same farms for a number of seasons. Present indications are that the variation between farms particularly with regard to the numbers of *Heliothis* eggs present, is greater than expected. Key recording sites were also established where scouting could be carried out on standard sprayed and unsprayed cotton plots at a number of sites for many years so as to show up any long-term changes in insect populations.

Preliminary work on the use of virus on *Heliothis armigera*, the American bollworm, shows that this is highly susceptible to the infection both in the laboratory and in the field. The more difficult task of finding out how to start an epidemic and so attain an economically worth-while level of control will be attempted in the coming season.

A number of insecticides were assessed against *Diparopsis* by means of the egg dipping and "period of larval wandering" techniques. The only really effective insecticides were found to be carbamates which appeared to have no particular advantages over carbaryl which is already in use, or were organo-phosphorus compounds of dangerously high mammalian toxicity.

Widespread reports of the failure of dimethoate to control Red Spider Mite lead to a series of preliminary small-scale field trials designed to assess alternative acaricides. The organo-phosphorous compounds tested were largely unsatisfactory except Azodrin which has since been recommended for aerial use. Of the non-organophosphorus compounds tested, dicofol and binapacryl gave particularly good control provided that the underleaf spray cover was good.

Control of termites attacking young cotton was obtained in a trial at Gatooma by applying a dieldrin spray to the soil surface.

An investigation into the use of molasses mixed with insecticides against a variety of pests showed that the American bollworm *Heliothis armigera* was susceptible to a mixture of carbaryl and molasses, though not to carbaryl alone. No adverse effects were detected, but a more detailed investigation will be made.

A large-scale trial comparing aerial and ground spraying was conducted at the Tokwe Development Company's Mpapa Estate in the lowveld. A detailed investigation was made of the spray deposits obtained using different rates of application on two varieties of cotton. An over-all indication of the superiority of tractor spraying was found although in practice the choice would be made more on the grounds of practicability or economics.

Cotton Plant Breeding

Irrigated breeding plots were planted during the first week in November and irrigated seed increased bulks on the 11th. Due to soil variation, stands were somewhat patchy.

All trials covering a Replicated Progeny Trial, a Small Bulk Trial, a District Variety Trial, an Inter-Territorial Variety Trial, a Long Staple Variety Trial and a Host Plant Resistance Trial were planted in an area which could be irrigated if necessary. This meant pushing the irrigation scheme which was designed for four acres per year to cover 12 acres.

Selection in the Small Bulk Trial was related to selection in the Replicated Progeny Trial and was conducted in the positive and negative directions. Thus, in the Replicated Progeny Trial, five strains were selected out of 24 in the negative direction and 20 out of 76 in the positive direction. Each of these selections will go forward to the Small Bulk Trial and four Phase I progenies from each will go into the Replicated Progeny Trial and Phase II progeny rows in 1967/68. Four selected strains from the Small Bulk Trial which are the ancestors of the selected progenies in the Progeny Trial will go forward to the District Variety Trials. The mean yield of lint in the Small Bulk Trials was 430 lb./acre with a ginning out-turn of 37.4 giving a yield of seed cotton of 1,031 lb. per acre. The mean boll weight was 4.9 gms. The corresponding means for positive selections were 450 lb./acre. 37.0 per cent., 1,217 lb./acre and 5.3 gms. respectively and for negative selections, 287 lb./acre, 35.6 per cent., 805 lb./acre and 3.8 gms. respectively. The apparent anomoly of the mean ginning out-turn being higher than that for the positive selections is due to the rather poor showing in yield of the three strains with the highest ginning out-turns. In single small scale spinning tests conducted in 1966, the negative selections gave the poorest performance, although selection has not been carried out in this direction on quality characteristics.

As a start in developing a seed multiplication scheme for Deltapine Smooth Leaf, 1,140 single plants were selected in the field and as a result of laboratory analysis on boll weight, ginning out-turn, seed index, lint index and Micronaire, a modal bulk was formed as a breeder seed nucleus to be planted at Triangle and Gatooma. In addition 40 single plants were selected to form the basis for a progeny row selection programme.

The third cycle of the recurrent selection programme commenced with the selection of 40 single plants for progeny row testing. The best of these progenies will be crossed in all possible combinations in 1968-69 for diallel testing.

Due to late delivery, analysis of the Inter-Territorial and District Variety Trials has not been completed. In the former category, the trial at Makanga in Malawi was destroyed by floods while in the latter, the trial at Macheke was abandoned because of poor stands. Very promising results were obtained from cotton in the Gutsa area of the Zambezi Valley.

Cotton Agronomy

The 1966/67 season was not very successful due primarily to the late planting rains resulting in the abandoning of certain experiments.

The yields of Nitrogen x Variety trial, which had supplementary irrigation, showed a significant response to nitrogen up to 12 lb. N_2/acre. However, had the control of Red Spider been more successful the yields of seed cotton would have been considerably higher.

Treatments in the Seed-bed Trial showed no significant differences. In the dry-planted plots the stands were generally poor.

In the pre-emergence herbicide trial Treflan and Planavin controller the grass weeds were planted but not the broad-leafed weeds. At the recommended concentration, Caparol and Herban were more effective against a number of broad-leafed weeds. Cotoran, applied at a higher concentration could possibly give a better control of grasses. Banvel D was extremely phytotoxic to the cotton plant.

There was no post-emergence work done this season.

The results of the Soil-moisture Sampling-Rotation Trial were disappointing. Soil moisture determinations taken monthly from March to September inclusive showed no significant differences in the first 12 inches of soil depth. The yield of the test crop, cotton, after cotton, maize, wheat, soyabeans and weed-fallow showed no significant results.

The first phase of the Ratoon trial was completed this year but the results are not available as they have been sent away for analysis.

Finally, poor plant growth in the Defoliation and Plant Growth Regulant (Cycocel) Trials resulted in their withdrawal.

GRASSLANDS RESEARCH STATION

After a late start to the season, less than two inches of rain being recorded to the end of November, good rains ensured excellent growth of crops and grass.

Animal Husbandry

Work with milled-mature-whole-maize plants was continued, beef cattle, dairy cattle and sheep being fed as much milled feed as they would eat plus varying quantities of protein.

In a milking trial, Friesland cows fed $\frac{1}{2}$ lb. or $\frac{3}{4}$ lb. crude protein for each gallon of milk after the second gallon and as much milled feed as they wanted, all gave $3\frac{1}{2}$ gallons of milk daily.

As two-year-old Afrikander steers fed milled feed containing 50 per cent. maize grain were only slightly heavier at slaughter than those fed milled feed containing 40 per cent. maize grain, it would seem more profitable to reap any extra grain in high yielding crops and use it for other purposes.

Once again Friesland cows grazing Muguga Star Grass pasture gave an average milk yield of four gallons daily for the four summer months, January to April, when fed crushed maize as the only concentrate.

The effects of lambing every eight months on the longevity of the ewe and the growth of the lambs is being studied, the ewes lambing in October, June and February. The effects on fertility of flushing the ewes at mating is also being studied.

It is becoming clear that any economic advantage, derived from the increased stocking rates associated with the use of large quantities of nitrogenous fertilizer, may be lost if gastro-intestinal nematodes are not controlled. The efficiency of new worm remedies controlling internal parasites is therefore tested with cattle and sheep.

The four Anthelminthics tested this season, Loxon, Rametin, Thibenzole and Tramisole, all gave good control of worms in a season of particularly heavy challenge.

Agronomy

Work with maize, beans, soil productivity and tillage methods has continued and work on the use of supplementary irrigation for crops such as groundnuts and soyabeans is being increased.

In a trial, in which the effects of depth of ploughing and adding of compost are being studied

maize yields were increased when four tons of compost dry matter per acre was applied each year for two years. The greatest benefit was obtained where the compost was ploughed under to a depth of 14 inches. Deep ploughing without compost did not increase yield.

The early maturing variety Hybrid 14 and the late maturing variety Hybrid 52 gave similar yields in a maize variety trial that was planted somewhat later than usual.

In a variety trial, three field bean varieties, introduced from Colombia, gave yields of more than 11 bags per acre and appeared to be disease resistant.

It was confirmed that the optimum plant population for irrigated maize on sandy soils is 19,000 plants per acre, the yield decreasing when the density was increased to 24,000 plants per acre. Hybrid 52 gave a consistently greater yield than Hybrid 14 when grown under supplementary irrigation.

Groundnuts planted in September and irrigated until the rains arrived, gave yields of 16 bags of shelled nuts per acre. This use of supplementary irrigation to lengthen the growing season, by utilizing the warm October weather, has been most encouraging and the work is being expanded.

Pasture

Certainly the most encouraging and possibly the most important aspect of the season's results was the effect of the legumes *Trifolium semipilosum* and *Lotononus bainesii* on yields when grown with grasses in a cutting trial. Creeping grasses were grown alone or mixed with either of the legumes, nitrogen being applied at levels ranging from 0 - 200 lb. of nitrogen per acre. Both legumes caused marked increases in the dry matter and crude protein yields of those plots which received no nitrogen. The seasonal total dry-matter yield of the no nitrogen plots containing *Trifolium semipilosum* was very similar to the grass only plots receiving 100 lb. nitrogen per acre annually, while the yield of the no nitrogen *Lotononus bainesii* plot was three quarters as great.

In a screening programme being conducted with the help of the nematologists from the Tobacco Research Board to develop nematode resistant strains of *Trifolium semipilosum* and *Lotononus bainesii* both species have shown over 80 per cent. resistant plants.

Ermelo Love Grass, Beehive, Wintergreen and Paraguay Paspalums and Muguga Grass were established in 2½-acre plots under a maize crop in the 1965/66 season. All plots were given 120 lb. nitrogen per acre and in the 1966/67 season and by the end of the season were carrying two steers per acre. Liveweight gains varied from 350 to 420 lb. per acre.

In a trial combining rates of nitrogen application and stocking rates on Muguga Star Grass the liveweight gains were disappointing. The maximum gain per acre was 480 lb. from the paddocks given 240 lb. nitrogen per acre and grazed by three steers per acre. This was, however, a new and poorly established pasture and the low gains per acre together with the harmful effects of high fertilizer/heavy stocking rate treatments strongly suggest that a newly established pasture should be both fertilized and grazed lightly in the first grazing year.

Chemistry

The Chemistry Laboratory was re-opened at the end of June, 1967, analytical work starting in mid-July and 950 protein determinations were completed by the end of September.

Representative samples of mature-whole-maize plants were taken from fields of Hybrid 52 and Hybrid 14 maize, in early August. The plants were broken down into their component parts, grain, cob, leaf, stem, etc., and full analyses are being undertaken.

A rapid qualitative method for the detection of cyanogenetic glucosides in green plant material has been successfully put into operation and large numbers of grasses and green fodders will be screened for this factor.

Legume Bacteriology

The selection and testing of *Rhizobium* for use with the more important legumes was continued, some 5,500 cultures having been handled.

The Legume Inoculant Factory prepared 7,300 bottles of inoculant for sale and 700 for experimental purposes. The factory has been altered and enlarged so that the method of manufacture may be changed from a jelly culture to a peat-culture. A peat-culture, properly made, protects the bacteria after they have been applied to the seed and is also easier to apply.

HENDERSON RESEARCH STATION

Substantial progress was again possible this year in general station development, in erection of buildings and in acquiring new machinery and equipment. Specialist lines of research, within the framework of the main agricultural disciplines, are being intensified. This specialization and concentration on few important problems, rather than diffuse effort on many, should enhance the contribution which this station makes to the Agriculture of this country.

Pasture

Studies over the past three years have shown that productivity of planted pastures for summer grazing may be greatly increased by heavy applications of fertilizer. This work has particularly significance in the crop-producing areas of Rhodesia where there are generally inadequate areas of veld on farms to maintain sufficient numbers of cattle and so make diversification into cattle production worthwhile.

Annual fertilizer applications to pastures of up to 240 lb. N and 80 lb. P_2O_5 per acre have been made and on such pastures it has been possible to graze five or more yearling cattle which gain a total of 800 to 900 lb. body-weight per acre during summer. Similar high-density grazing with sheep has been tested.

Many of the commonly-used pasture grasses of upright growth habit have been found unsuited to intense grazing pressure while stoloniferous and rhizomatous types seem better adapted. Detailed investigtions are now in progress to assess long-term productivity of pastures used in this way and to determine their yields at various levels of applied fertilizer.

Research continues into the establishment of various legumes in veld and established pastures.

Animal Husbandry

In response to changes in consumer demand methods of producing leaner beef carcases have been explored. Aspects which have received study have been effects of providing additional food to cows so that their calves are heavier and better development at weaning (600 to 700 lb.), the feeding of such heavy weaners on high grain diets so that they reach slaughter weight at a young age (12 months) and the capacity of different types of cross-bred steers to produce lean meat rather than fat.

Effects of various levels of feeding on body compostion have been studied in young lambs and in mature Dorper-type ewes which have either gained or lost body-weight. The high proportion of fat (85 per cent. of dry matter) in body gains has been remarkable. This problem of excessive fat deposition in meat-type animals forms the main theme of future research.

During the year studies on the nutrition of young dairy-type calves were initiated and progress was made in the development of systems of rearing calves on minimal amounts of milk and in devising suitable complete dry diets for both calves and dairy cows.

Work has also been undertaken to study the productivity of beef cows fed on diets containing very high levels of molasses and further progress is reported in studies of the physiology of ruminants fed on high-concentrate diets.

Agronomy

Special attention during the past year has been paid to the control by herbicides of weeds commonly infesting maize, groundnut, cotton and other field and horticultural crops. In addition to testing the efficacy and residual effects of a large number of herbicides, studies have also been made of the seed production of various weed species and the viability and germination patterns of these seeds. A member of the professional staff of the Agronomy Section was away for the greater part of the year on study leave in Europe where he specialized on weed research.

Work was also done on varietal testing of maize, cotton, soyabeans and wheat while agronomic experiments were carried out on irrigated crops. Plans are now well advanced and some work has started on development of 18 acres of overhead and 25 acres of flood irrigation. It is hoped that this scheme may cope with the growing demand for information on highveld irrigation.

Horticulture

Horticultural research continued into testing which available varieties of tomatoes, onions, cauliflowers and strawberries, etc., were best suited to local conditions. Some work was also done on cultural requirements of some horticultural crops. During the year an orchard of deciduous fruit trees was planted and tests are to be made of methods of local grape production.

Dairy Unit

The 300-acre dairy unit continues to show increased profitability and has yielded valuable data on costs of producing maize and milk on a small intensive farm. Likewise the small-scale experimental African farms, of which there are three, have shown marked improvements on output in the past year. These farms have attracted a great deal of attention and some 4,500 visitors, mostly African, visited the projects during the last 12 months.

Fisheries

In accordance with the decision that Fisheries Research was no longer to be a responsibility of the Ministry of Agriculture, the work has now changed to one of an advisory nature involving much travel. Training courses have been conducted and Fisheries field days have been held in many European and African farming areas. On Henderson, the Fisheries now function mainly as hatcheries and concentrate on fry production for stocking farm dams.

MATOPOS RESEARCH STATION
(including Tuli and Tjolotjo Sub-stations)

Totals of rainfall for the year at Matopos Research Station and the Tjolotjo, Nyamandhlovu and Tuli Experiment Stations respectively were 24.3, 24.5, 33.6 and 22.8 inches. In general, rainfall was well distributed.

Agronomy

As in previous years, emphasis was placed on the study of the sorghum crop on dryland but some work was done on maize, lucerne, groundnuts and wheat. New trials were initiated to study the effects of variety, time of planting and of spacing on yields of irrigated maize and sorghum.

Most of the crop experiments were sited on Matopos Research Station but co-operative expermiments were also done on the Gatooma and Salisbury Research Stations, the Makoholi and Nyamandhlovu Experiment Station, and at Gwebi Agricultural College. A series of fertilizer experiments on sorghum were done in co-operation with the Department of Conservation and Extension in the Tengwe, Mount Darwin, Que Que and Victoria intensive conservation areas.

More than 75 sorghum grain hybrids were under test in various trials. NK 300A was again the best hybrid tested with T.E. Grain-master giving the highest yields among the newly-introduced hybrids. In tests of forage sorghums the open-pollinated varieties again outyielded the hybrids. The sorghum-Sedan grass hybrids gave low yields and the regrowth after the first cut was severely infected with Downy Mildew.

The new maize hybrid SR 14, bred at Salisbury Research Station, proved superior to the other Salisbury hybrids. Of the quicker-maturing hybrids NPP x K64r, PPP x K64r, Gunson's GS 60, Pioneer P44 and Sabi I all performed well.

In the coming season a number of crop trials will be sited on Tjolotjo Experiment Station.

Pasture

Four new experiments have been started on Matopos Research Station to study multi-paddock grazing systems and the effects of various mowing, grazing, discing and fertilizer treatments on the grass-species composition of the veld. In addition, a further experiment is being laid down on Nyamandhlovu Experiment Station to compare production under the one-herd-to four-paddocks system with that under a multi-paddock quick-graze-long-rest system.

The results of botanical analysis of grazing trials on Matopos Research Station confirm that the veld remains stable under the currently-recommended systems, provided the recommended stocking rates are not exceeded.

High priority is given to studies on bush control. Apart from fire, ring-barking, with the subsequent removal of coppice growth, has been shown to be a practical and cheap control measure on a wide variety of woodland types. It has also been shown that goats can be used to control bushes and shrubs which are too small to ring-bark. It is thought too that goats could be used to control the coppice of ring-barked trees.

Combretum apiculatum, a common species, has been found in the past to be extremely resistant to fire, ring-barking and arboricides applied at normal concentrations. Recent work has shown that this species can be killed by applying higher than normal concentrations of arboricides, 8 ml. undiluted Tordon 22K per tree or two, four, five-T in old engine oil (4 per cent. a.e. w/v) at the rate of one gallon of mixture to 10 trees; both chemicals were applied to axe cuts in the lower part of the stem.

In preliminary work aimed at introducing legumes into the veld, 126 perennial legumes and 23

annual legumes have been planted in a screening nursery on red clay soil. Root examination showed all but one (*Phaseolus lunatus*) to have nodulated satisfactorily. A nursery will be established in sandveld soil in the coming season.

Animal Husbandry

In a long-term large-scale breeding experiment on Matopos Research Station in which the effectiveness of selection under two planes of nutrition is being determined, marked cumulative effects of feeding for maintenance in winter are becoming apparent. Heifers which are the progency of dams fed during the dry season and which are fed themselves have attained suitable breeding weights at two years of age. In order to determine the relationship between chronological and physiological age, such heifers have been put to the bull.

Similar cumulative effects in the case of the male progeny have resulted in a reduction in the length of time required for steers in the feed-lot to achieve suitable slaughter weights.

In an experiment in which a mixture of two-trace-minerals, cobalt and copper, is being fed alone or in combinations with protein supplements during the dry season, there was a small response in terms of live weight gains to trace-mineral feeding and the usual large response to protein supplements. The trace-minerals are cheap and their effect is thought to be due to the stimulation of micro-organism development in the rumen.

The figures for the Dairy Unit for the year 1965-66 indicate that the milk sales per cow increased by 24.6 per cent. from 1964-65 to 1965-66. This increase is mainly due to a 16 per cent. reduction in the number of dry cows in the herd. These results emphasize the importance of controlling the diseases causing mastitis and infertility, which are major problems in commercial dairy herds.

In studies on mutton production, various systems of management have been compared and the results to date indicate that the feeding of protein supplements to ewes during the dry season was responsible for the increased fertility of ewes, heavier slaughter weights of their male progeny and, in keeping with the results for cattle, progressively greater weights of maiden ewes.

It seems that the problem of grass-seed penetration can be overcome by management but as feed costs differ under different management systems more work is needed on this aspect.

Studies have been initiated to investigate the low dressing percentages which occur in wethers killed at liveweights ranging between 60 and 80 lb.

Breeding and selection on the Tuli and Manguni Breeds was continued at the Tuli and Tjolotjo Experiment Stations respectively. In the case of the Tuli herd progress has been hampered by the need to remove the herd to drought-relief grazing during the first half of 1966. While the cattle were off the station, breeding was uncontrolled and the calving percentage last year was only 43.

Both breeds did well in the inter-breed classes at the Bulawayo Agricultural Show.

MAKOHOLI EXPERIMENT STATION

Following a rather hesitant start, intermittent showers extending late into the season resulted in sustained growth conditions for annual crops and veld alike. Single hybrid 52 maize yields 28 bags/acre under field conditions, whilst some experimental yields attained 48 bags/acre. Stock maintained condition well throughout the year.

The electrification of the station became operative in January, and appropriately this development takes pride of place among the highlights of the year. Much remains to be done, however, to fully integrate this power source into all aspects of the Station's work. The Tobacco Research Board's Victoria Research Station was officially opened in February. Water supplies were further enhanced by the provision of a second weir on the Mshagashe River and by an additional storage reservoir for domestic water. A major improvement was the erection of centralized garages, workshop, and stores, forming the basis of the new farm centre.

The year saw an unprecedented number of visitors—3,576—attending field days. The combined approach adopted by the Alvord Institute, Victoria Research Station and Makoholi in this regard appears very worthwhile.

Agronomy

The maintenance and improvement of sandveld fertility, together with the determination of crop requirements for optimum yield, continued as the prime interest of the station in the agronomic sphere. Maize grown with or without compost,

but with adequate NPK continues to show little or no yield response to either residual or direct compost applications after three years. Nine and 14-inch ploughing depths improved maize yields to 26 bags/acre compared to 20 bags/acre with four-inch ploughing without conditions of moisture stress. A study on the annual frequency of ploughing (nine-in depth) suggests that this frequency may be reduced at least to alternate seasons without appreciable loss in yield. An investigation in ntrogen x base interaction with both maize and sorghum and a long-term fertility maintenance trial were commenced. Some progress was made in growing sorghums on sand, but so far the yields of this crop do not approach the better maize yields obtained. Groundnuts were geinerally disappointing in the year under review.

Animal Husbandry

Studies in the phosphate supplementation of veld grazed cattle continued, and the operative nutrient in responses recorded to date was confirmed as phosphorus. A second trial concerned with the effects of bone meal supplementation of growing stock was concluded with the slaughter of the two-year steers involved. Control animals dressed at 434 lb. whilst those receiving bone meal dressed at 463 lb. representing an additional realization of £3 9s. 4d. per head. First calving heifers supplemented with bone meal during their own growth subsequent to weaning produced calves weighing an average of 43 lb. each more than contemporary control animals at weaning. An experiment with cows suggests that pregnancy (dry season) supplementation and source of phosphate are of little importance in respect of calf suckling growth.

The study designed to evaluate the usefulness of performance testing as a selection procedure for bulls, with respect to both high plane and veld conditions of nutrition continued, with the second group of high plane progeny finished for slaughter during 1967. With the co-operation of the Agricultural Research Council's Biometrics Team, a detailed study of the inter-relationships between weight, gain and feed intake was commended, using accumulated performance test data.

Fish

Thiry-thousand black bass fingerlings were made available to Lake Kyle and 10,000 bream were supplied to farmers for dam stocking purposes.

RHODES INYANGA EXPERIMENT STATION

Over-all, 1966-67 was a very wet season, with a total of 61 inches at the new site and 52 inches at the packing shed. Variation from the long-term mean was most pronounced in March, with 12.26 inches (mean 4.52). October, November and April all had appreciably lower totals than usual.

The winter was again, initially, very mild—with June mean minima 5.1°F higher than average. July temperatures were normal, but August and September maxima were 3.6° and 2.2° lower than normal, respectively.

Anemometers to measure wind reductions achieved by the 1962 planted Pinus patula windbreaks were installed at 100-foot intervals from the break in the Apple Nutrition Trial. A Gunn-Bellani pyranometer, calibrated for the station, was installed by the Meteorological Department.

Investigational Work

All extant apple, pear, peach and plum trials have been continued with no revision of differential treatments, and no additional varieties have been planted in the screening trials.

For the first time extensive analyses of leaves from the Apple Nutrition and Management Trials have been undertaken. The Agricultural Research Council's Soil Productivity Research Team carried out pot experiments on soils from the station confirming that no unsuspected major or minor nutrient deficiencies existed. Consideration of leaf and soil analyses led to imposition of extra "ameliorative" fertilizer applications on an over-all basis.

Measly bark on Starking and W. W. Pearmain shows no sign of abating despite heavy liming. All experimental trees in the Apple Management Trial have received a soil application of boron to see whether a deficiency of this element could be responsible for this disorder. Poor cane growth in raspberries may also have been due to a deficiency of boron, and in a new planting of the variety Lloyd George, this possibility is being investigated.

Losses due to mole rat damage are still being sustained; in January a survey showed that 37 per cent. of trees in the Peach Management Trial were affected in some degree. Some further deaths attributable to Armillaria attack have occurred in apple trials, but none in stone fruit trials since their inception. In May, about 6 per cent. of both

experimental and guard trees in the Apple Management Trial had either died during the previous growing season or were considered to be dying. It is believed that where death was due to mole rat damage this was not of very recent occurrence, and that the present poison gas and bait programme is achieving some control.

A new Apple Establishment Trial was planted on the site of the defunct Apple Pruning Trial, with new planting stations midway between the old. Presence and absence of lime, high and low phosphate, deep and shallow incorporation of these two, presence and absence of manure in the planting hole and the effect of DD fumigation will be compared. Preliminary screening of six possible nematicides was carried out by the Senior Nematologists on an adjacent site where a lesion nematode (*Pratylenchus* sp.) had caused extensive root rot on apples.

At the beginning of the year soil fauna investigations were concentrated on broad changes found in the populations under various organic mulches. Later, in consultation with staff of the University College, these studies were temporarily discontinued in favour of detailed examination of faunal associations in nematicide treated plots.

To obviate the risk of mole rat damage invalidating the Apple Establishment Trial, half-inch mesh wiring netting has been sunk to a depth of five feet around the perimeter, and an intensive poisoning programme was undertaken in the trial area prior to planting.

Attempts to estimate lateral and vertical root extension of peach through moisture extraction patterns (determined with gypsum blocks), have been relatively unsuccessful because of weed interference. A small block of Boland peaches has now been planted specifically for this purpose. A hundred per cent. weed control is the aim: to be achieved by combining chemical and mechanical means. Selected trees will be excavated at suitable intervals to check on the method.

LOWVELD RESEARCH STATIONS

(CHIREDZI, SABI AND CHISUMBANJE)

Chiredzi Research Station

Development work on the new lowveld station proceeded satisfactorily, and the first experimental crops were planted on schedule in April, 1967, when field trials were initiated on wheat and seed beans under overhead irrigation.

Wheat yields were relatively low due to an outbreak of stem rust early in the season which spread rapidly and reached fairly severe proportions. In spite of the disease, data from all but one of the experiments were unaffected and results were of considerable value. Fertilizer trials demonstrated the essential need for phosphate on virgin paragneiss soils, but showed that responses to nitrogen were slight. A variety trial provided useful information on disease resistance and yield potential of a wide range of material. Irrigation frequency studies demonstrated the need for frequent light irrigations, and clearly indicated the adverse effect of moisture stress during the active growth period up to ear emergence. Yields from the wheat experiments varied from nine to 19 bags/acre, and the crop received 10 to 12 inches of irrigation water.

The seed bean crops were outstanding, and experiments planted to Canadian Wonder yielded 11 to 14 bags per acre. Fertilizer trials confirmed the need for adequate nitrogen and phosphate yield responses being obtained up to 200 lb. N/acre all applied at planting. Irrigation frequency studies showed that frequent light irrigations produced a high-yielding crop of relatively poor quality, and that a relatively dry moisture régime was more desirable in that it improved quality without reducing yield. Severe moisture stress reduced yields by five bags per acre.

In addition to the experiments on wheat and seed beans, small non-experimental plantings were conducted on maize, soyabeans, safflower, barley and potatoes.

Sabi Valley Experiment Station

During the 1966-67 summer season cotton variety trials were conducted on behalf of the Gatooma Research Station, and the wide range of varieties tested varied in yield from 2,700 to 3,900 lb./acre seed cotton. In a fertilizer trial on cotton, high levels of nitrogen were found to have a depressing effect on yield, and no responses resulted from applications of phosphate and potash.

A maize variety trial confirmed the general superiority of short-season types, and the disappointing performance of Rhodesian hybrids under lowveld conditions. Strong linear responses were obtained to applications of nitrogen, but applications of phosphate and potash did not increase yields. A small, but significant, response was obtained to applications of boron. In a spac-

ing trial, yields did not differ over the range of spacings and plant populations studied.

Experimental work on soyabeans was intensified, but yields were disappointing at 6 to 12 bags/acre. No significant yield responses resulted from applications of nitrogen, and yields did not differ over a wide range of plant spacings studied. A variety trial compared yield potential and disease tolerance of 12 soyabean varieties, which varied considerably in adaptation. Irrigation frequency studies were conducted to compare a wide range of moisture régimes, but results were inconclusive due to the influence of rainfall.

During the 1967 winter season a small overhead irrigation unit was brought into operation, and the winter research programme was concentrated on wheat and seed beans. In spite of fairly severe stem rust attack, valuable data were collected from the wheat trials and yields averaged about 18 bags/acre. Fertility trials confirmed the need for adequate nitrogen, but showed that there was no advantage in splitting the nitrogen dressing. As usual, no yield responses resulted from applications of phosphate and potash. The yield potential and disease resistance of 20 wheat varieties was evaluated, in conjunction with similar variety trials at Chiredzi and Triangle.

The bean experiments again showed the high potential of Canadian Wonder in relation to other varieties, and confirmed the need for adequate nitrogen fertilization. Irrigation frequency studies demonstrated the need for frequent light irrigation, and showed that yields could be reduced by five bags/acre if moisture stress developed during critical growth stages.

Work on the water requirements of sugarcane was continued, and irrigation studies were initiated on lucerne. Seed cane was collected from the sugarcane variety nursery for planting on the R.S.A. Experiment Station at Chiredzi.

Chisumbanje Experiment Station

The summer season was characterized by heavy rainfall, and a seasonal total of about 30 in. had an adverse effect on crop growth. Cotton yields were lower than normal, and varied from 2,500 to 3,500 lb./acre seed cotton. No significant yield responses were obtained to applications of phosphate and potash, but small benefits were obtained from nitrogen. A spacing trial showed that 3-ft. rows were better than 4-ft. rows, but not better than 3½-ft. rows, and no differences resulted from various plant spacings in the row. Observation plots of Deltapine Smooth Leaf showed that it was considerably higher yielding than Albar 637.

Maize fertilizer trials confirmed the strong linear responses obtained from nitrogen in the past, and 160 lb. N per acre gave 15 bags/acre more than the control plots. No significant yield responses were obtained from applications of phosphate, potash, and boron. A spacing trial compared a range of plant spacings and populations without showing any significant yield differences.

Satisfactory yields of 10 to 12 bags per acre were obtained from a soyabean trial. No yield response was obtained to nitrogen, nor to a range of row spacings studied. Groundnut trials were affected by rat damage late in the season, and yield data were unreliable and inconclusive.

The winter programme of wheat and seed bean trials at Chisumbanje was completely decimated by the unprecedented build-up of rodent populations, and no results were obtained from the scheduled programme.

GWEBI AGRICULTURAL COLLEGE

The season's rainfall was seven inches below, a most serious deficit occurring during the planting period of November-December resulting in a very difficult cropping season. Fortunately, the rains extended into April and final results were generally very much better than originally expected; for example, in the case of maize an average yield of 28.4 bags per acre was recorded as against 31 bags the previous year.

Alterations to the hostel to cater for an increased intake of students were completed shortly before the 1967 term opened. Alterations to the Principal's house are in hand and various modifications have been made in the Mechanical Workshop Section to increase efficiency in instruction. A new cooler plant has been installed in the Poultry Section, and a four-stall two-unit pipeline milking plant was installed in the Dairy.

An extremely generous donation of equipment by Rhodesia Oxygen enabled the Welding Shop to be radically modified, and an additional reservoir has been constructed at the main filtration plant in an endeavour to overcome some of our water problems.

Several papers were submitted for publication by the Poultry Section covering work undertaken during the year.

In the Animal Husbandry Section, the College dairy herd was placed third in the official section of the milk recording scheme and fifth in the semi-official herd averages. Nine young Hereford bulls were sold at the Mount Hampden stockyard auction sale, averaging 250 guineas each.

Although satisfactory results were noted with the Blackhead Persian flock, some rather disappointing performances in the College pig herd indicated that greater attention must be directed to litter numbers and numbers of piglets weaned per litter.

The Engineering Section had a busy year assisting in the general maintenance and development of various College facilities and was involved in the first in-Service Training session held at the College during the Long Vacation.

Thirty-two students sat the final Diploma Examinations in 1967; 29 obtained Diplomas of the College, 12 of these being First Class. Of Course 18, 40-strong initially, 34 passed into their second year, and Course 19 commenced with a total of 44 students, making an over-all total of 78 men in residence.

Research activity is restricted, student education being the main priority. However, various investigations were undertaken in conjunction with other Departments of the Ministry.

Diploma Day was held on 19th October, 1966 and Dr. and Mrs. Iain McDonald were the Guests of Honour.

The President of the R.T.A. and his wife, Mr. and Mrs. Carol Heurtley, were our Guests of Honour at our annual Sports Day gathering.

A large number of visitors were welcomed to the College over the year, including the Secretary for Agriculture, Mr. R. A. Griffith, and the Deputy Secretary, Economics and Marketing, Major G. Cox, who were our Guests of Honour at the Leavers' Dinner.

During the Long Vacation the College exhibited livestock at Umtali, Salisbury, Gwelo and Bulawayo. Considerable successes were achieved against very strong competition. Of particular note was the award of Champion Dairy Bull to the College junior dairy stud sire, "Exwell Dursley II", at all four centres and the award of three Hereford Female Championships to three different animals at three of the centres.

Various members of the staff continued to take an active interest in a variety of committees. The College is greatly indebted to the willing co-operation of many officers of our own Ministry and of other Ministries, of the University, and of members of commercial concerns who assist the College in the capacity of visiting lecturers; their contribution to the over-all course is very greatly acknowledged.

CHIBERO COLLEGE OF AGRICULTURE

The College was honoured by a visit from His Excellency the Officer Administering the Government, and Mrs. Dupont, on the 25th November, 1966. An increasing number of distinguished visitors, including Members of Parliament from Britain, were shown around the expanded facilities which Chibero now provides for its enlarged student complement.

The Fourth Diploma Day Ceremony was held on the 22nd March, 1967, when Mr. and Mrs. J. C. Graylin were the Guests of Honour. T. J. S. Hove, from Belingwe, Rhodesia, was the Best All Round Student of his Course. Mrs. Graylin presented the Diplomas and Awards, while Mr. Graylin officially declared open the new Hostel Wing, Recreational Centre, Sick-Bay and Clinic, and the Lecture Theatre and Administrative Block.

During the year, the College Advisory Council met on three occasions, under the Chairmanship of Dr. B. S. Ellis. The Vice Chairman of the Council of Chiefs, Chief Mzimuni Masuku, of Gwanda, was appointed to the Adivsory Council, while the Minister of Agriculture invited Mr. K. D. Kirkman, Donnington, Norton, to join the Council in place of Mr. F. R. Lilford, who had to resign because of ill health. The College takes this opportunity to pay tribute to the services rendered to the Council and Chibero by Mr. Lilford from his appointment in December, 1964. Mr. A. Jacha, M.B.E., and Dr. D. H. Saunder, M.B.E., were re-appointed to Council for the two-year period, 1st July, 1967 to 30th June, 1969.

Apart from the development of expanded facilities at the Hostel, and Administrative and Tutorial buildings, 162 acres of the original "Block B" sub-division of Chibero Mission Farm were purchased, and the Ministry of Water Development commenced the 24,000,000-gallon irrigation dam on the Nyawiye River tributary. The scheme will provide facilities for the practical teaching of flood techniques, the first four acres scheduled

to grow wheat in the winter of 1968. In the Animal Husbandry Section, new Poultry Battery and Deep Litter housing, and Piggery accommodation, were provided to meet the practical needs of increased student numbers, while in Field Husbandry a Fertilizer Store, a second-hand Tobacco Boiler and the additional overhead Irrigation Borehole were implemented.

Although the total rainfall for the year was 33.84 in., the distribution was somewhat abnormal compared with the seven-year mean. However, Field Husbandry production continues to improve, a new over-all farm average of 27.8 bags of maize grain per acre being achieved, while Flue-cured and Burley Tobaccos sold 2,038 lb. and 2,350 lb. per acre, respectively. Similarly, Animal Husbandry production shows a steady increase. "Chibero Adrienne" completed her second lactation with national Jersey breed record figures of 1,354 gallons, at 4.58 per cent. butterfat in 300 days, while eight 21-month-old Mashona steers all graded Chiller I and averaged a return of £37 10s. each.

Thirty-two students were enrolled on the 30th September, 1967, in Course 7, while Courses 5 and 6 had a combined complement of 26 at that date. In general, satisfactory reports continue to be received about their application ability in post Diploma employment, of the 21 successful men from the first four completed Courses of the College, and it is of interest to record that N. E. Mumba, a First Class Diplomate from Course 1, has been accepted at the University of Uppsala, Sweden, for a four-year B.Sc. degree in Soil Science.

Apart from the increased number of overseas visitors, further publicity for the College resulted from a Salisbury R.T.V. film and interview on the 22nd March, 1967, while Mr. Derek Bray, from "Ulster Television", spent a day at Chibero in July, 1967, as a result of which some five minutes of his 50-minute Rhodesian film will appear on certain overseas networks. In addition, during August and September, 1967, a complete new College Prospectus, including a revised syllabus, was produced and sent for early publication.

J. C. RAATH,
Director, Research and Specialist Services

Department of Conservation and Extension Report

for the Year ended 30th September, 1967

INTRODUCTION

The post-independence period has required readjustment to changed economic circumstances. New sources of essential supplies have had to be located and production switches made.

Industry, faced with this situation, has already successfully made dramatic changes. Farming is facing the same situation, but quick switches from one line of agricultural production to another are not easily made. Dependent as it is on biological factors, and variabilities of climate, agriculture moves with understandable caution, and is loth to leave those paths with which it is most familiar.

When changes must be made they are made by the personal decision of each individual farmer. This calls for courage and skill and in order to exercise that skill the farmer must have access to the best technical and economic information relating to the various alternatives from which he will choose.

At the time when there are more imponderables than usual, this Department, sensitive to the unique difficulties facing the farmer, has endeavoured to support and serve the industry by providing it with whatever counsel it has required.

In the tribal areas the staff of the Department has made substantial gains in re-establishing effective extension contact with the African people through their established and authoritative institutions. As a result of our field staff being completely accepted by the people of the tribal areas it has been possible to work with them towards improved living standards, using the vehicle of profitable argiculture.

ORGANIZATION AND STAFF

Organization

During the year work areas were re-organized, by reverting to the position where a field officer works only in the tribal area or only in the farming area. The change has been accomplished except where held up because of shortage of staff.

This re-deployment has improved the service to the farming community and officers are more settled. Although technical problems in all categories of land are similar, the ways in which solutions can be achieved calls for a variety of approaches. In particular the tribal areas require the services of patient and dedicated staff of steady resolve, able to work with enthusiasm in an atmosphere usually characterized by ignorance and inertia. The problems of the tribal areas are so unique and of such magnitude that those concerned with attempting to help in finding solutions need to spend all their working time directing all their thoughts to the subject. Indeed, to this end it is felt, in some quarters, that the new work arrangement in the field should extend beyond Group Officer and Regional Officer to the level of Assistant Director at Head Office, such officer to devote full-time to the business of the tribal lands.

European Staff

The staff position shows an improvement on last year; only 15 Extension Officer posts are now vacant. There has also been considerable movement of staff: transfers, promotions and military training have had an unsettling effect. Nonetheless, officers have worked most efficiently throughout a difficult year.

The need to diversify agriculture has created staff problems: more specialists are required at provincial level. The situation has created particularly heavy demands for advice on animal husbandry, agronomy and irrigation.

Although salaries are somewhat improved there is still dissatisfaction. Particularly annoying are the numerous pinpricks that are associated with the domestic circumstances of field officers. There used to be hidden benefits in working for Government in a rural situation, but these advantages have steadily been whittled away. Controversy about such matters as house decoration and water charges is the cause of much vexation.

African Staff

Forty-three new Extension Assistants were taken into the Department at the beginning of 1967. These were the first product of a new type of training being given at the Agricultural Schools, which now demand Junior Certificate as minimum entry qualification to the agricultural course. The 1967 intake had agricultural training for two years post Junior Certificate, and future intakes will

have covered the same post Junior Certificate course in three years.

The requirement of a higher level of basic educational standard for Extension Assistants entering the service is likely to produce men who will improve the quality of our staff. Some Extension Assistants recruited a few years ago would be unable to meet the standards required to-day. These were the last out-put of the four-year agricultural course which required only Standard VI as entry qualification.

Nonetheless they have worked well and there has been an over-all improvement in job performance. Supervision is more efficient and African staff are enjoying the co-operation of, and acceptance by, the people in the African areas. Our staff has prestige and status and in this improved climate of co-operation they are working well.

Housing for African staff is a perennial problem and only 1,075 of our field staff (excluding orderlies), of 1,425 is housed. Prefabricated housing, as a temporary expedient, is not successful. Such accommodation is not popular and some of the structures provided do not qualify for the name of "house", being merely shelters. They are a maintenance problem from the moment they are erected. Brick houses are needed.

The poor housing situation is the principal reason for low morale among staff.

However a new programme of building is being organized in the Provinces, by the Public Works Department, and this promises to bring quick relief to the situation.

There has been a commendable effort to carry out maintenance and renovation work on older African staff houses, but not at remote stations. This work is most welcome but it is on a small scale when compared to the size of the problem.

As an interim measure it would be an improvement if funds for maintenance, renovation, the provision of guttering, water-storage tanks and latrines, at African staff houses, could be held at and operated by provincial office. Local contractors could carry out this kind of work easily and cheaply.

Many of the occupied houses are dependent on precarious water suplies and guttering and storage tanks can do much to alleviate the situation. Much more guttering and many more tanks are needed.

The in-service training of African staff has principally been carried on at district level, although many Extension Supervisors and Assistants have been associated with training courses for African farmers held at institutes. Staff training has been clearly related to the needs of the field situation and the plans programmed to meet those needs.

A staff training and supervision system known locally as the "ten-point programme" condenses into 10 key points the most important facts in any enterprise. These are then the basis for extension work. The system is in wide use and seems to bear fruit. This description is over simplified but the system combines training and organization of the field work of African staff and results indicate that there is much to commend it.

With the exception of those unsatisfactory situations where there are vacancies in the supervisor establishment, the standard of supervision of the large staff of Extension Asistants has shown marked improvement. This may be related to training courses in supervision that have been attended by many Extension Supervisors.

This improvement is evidenced in the increased and more effective use of programme plans and work programmes. The more frequent use of efficiency reporting as a basis for job performance evaluation is being employed. Staff welcome this more immediate appraisal of their work for it provides opportunity to discuss problems and training needs with their superiors.

Transport

By careful planning, to operate within the limits of fuel allocations, and to avoid incurring excess mileage that would be reimbursed at only half rate, officers operating their own vehicles on Government duty (and these are the great majority of our staff), have managed to carry out their duties to service the farming community: this in spite of the serious and increasing deterioration of many of the roads in the African areas. The maintenance of some roads has been abandoned by Government anticipating that a responsible local authority will take over the work; but few such bodies are functional in this respect. In the meantime, and in some places commercial transport has ceased to operate and our officers are increasingly depended upon for the carriage of small loads: fertilizer, insecticides, etc. This is a real service given without complaint in extremely

bad travelling conditions. It is the kind of small observance that builds goodwill, and is important in the rural situation. And yet it is going to be difficult to maintain the service and likely that the goodwill will be lost, if circumstances necessitate incurring extra mileage at half rates. It is thought in many quarters that even now the *full* rates are inadequate for mileage travelled in the rural areas and yet officers are faced with the possibility of having to operate their vehicles in these conditions at only half rate!

The demands of diversification make it likely that extra mileage will be required and it is to be hoped that there will be a sympathetic understanding of the unenviable position of those officers who operate their own cars on Government duty in the rural areas.

A further unsatisfactory aspect of staff travelling is the meagre mileage allocation for supervisors. The good work and improved performance of these men is mentioned above, but if all of them are to be effective in their most important job these men need to be more mobile than they are at present.

VISITS TO OTHER COUNTRIES

Appendix I, details the study tours, visits, international conferences and seminars attended by members of the Department. There were 23 such visits this year, almost twice the number recorded for 1965-66.

It is important to note that more than 70 per cent. of these trips were to South Africa, that country having generously given our men access to its research establishments and every facility to staff who wished to visit various places in connexion with their work. In particular production and marketing of deciduous fruit, viticulture and various aspects of animal husbandry have been the subject of study.

The Directorate and Branch Specialists are widely involved on committees and boards, where their technical advice is a necessary resource. This commitment has enlarged, particularly as a result of increased activity in the field of community development where our experience with rural communities makes our counsel particularly valuable.

SERVICES

The farm visit is the most effective contact an extension worker makes with his clientele. It is in the personal and relatively informal circumstances of the meeting between the two men that the farmer can really present those problems that are peculiar to him and his farm to a sympathetic listener who is ready to help. While there is no doubt that farm visits are time consuming and expensive, they are nonetheless esssential in extension work and particularly effective when employed in combination with other extension methods. It is therefore disappointing to report that the true extension farm visit is a relative rarity. The farm visit nowadays is usually in connexion with surveys of one sort or another, carried out on behalf of other agencies, Agricultural Assistance Board, Farm Irrigation Fund, Tenant Farming Scheme, Diversification Committees. Also at the present time there is a growing demand for advice about whole farming systems and farm management. Unless some of the intrusive work mentioned can be shed it is unlikely that our officers will be able to provide the farmer with the information and opportunity for discussion that his situation requires and which is best met by a farm visit.

In spite of the minimum extension contact presently possible our staff have excellent acceptance, particularly in the European farming communities. This contact may even be lost if visits continue to be only of the data-collection type.

It may also be timely to re-locate our field stations on the basis of extension officer/farmer/agricultural production ratios. Patterns have changed and statistics might suggest some beneficial re-development.

In the present situation with opportunities for farm visits limited, it is more than ever desirable that officers work to a plan agreed upon with their Intensive Conservation Authority Committees. Many are already doing this to great advantage and efficient use of time.

In the African areas the visit has the same significance in establishing rapport between extension worker and farmer, but Extension Assistants tend to visit only selected favourites, and visit them frequently and regularly to the neglect of others. In spite of this, a general good spirit prevails and Extension Assistants receive many requests for visits. However the conduct of a visit is a skill, and there is a need for Extension Officers to train their subordinate staff in how to make the most of a farm visit.

Diversification problems have brought an increasing number of farmers to our offices.

Information on irrigation, horticulture, animal husbandry and economics is particularly sought. The accessibility of any office of the extension service is related to its effectiveness; it can be noted that those premises that are "off the beaten track" receive fewer callers. Where this is the case it might be thought that the farming community is offered less than optimum service.

The effectiveness of extension via groups is evidenced by the Department's long and fruitful association with such formal organizations as the I.C.A. Committees, Farmers' Associations and R.N.F.U. Working with these organizations continues, and in the case of the R.N.F.U, improved and profitable relationships are reported. In most parts of the country I.C.A. Committees are effective platforms for the dissemination of information: and perform a most useful service to the agricultural industry.

Work with informal groups, at field days and in discussion groups is very effective extension and is being widely employed. However it must be acknowledged that no one method of extension can stand alone but needs to be used in combination with others, to be wholly effective. Group methods stimulate interest which, ideally, should be followed up by individual methods, particularly the farm visit. The difficulties associated with visits to farms have been dealt with fully above, and this paragraph serves to highlight the consequences of forfeiting extension for other duties that are considered to be, but may not be, of priority importance.

To be really effective groups should not be too large and therein lies a problem for extension in the African areas. When a group meeting is organized "The bush telegraph" goes into action and the meeting becomes "over-subscribed", to say the least. Hundreds may turn up, perhaps principally to enjoy the social exchanges that such occasions afford and educational aspects suffer accordingly. It is pleasing, as well as important, to note that this enthusiasm indicates that the fear to attend our meetings has disappeared, along with intimidation. With a pleasant spirit of co-operation prevailing the problem of *over* attendance is not serious and will be overcome and care taken to preserve the harmonious atmosphere that has recently developed in the African areas.

In many places teaching via groups has been associated with Test Demonstration Plots which are now giving way to demonstrations of whole farming systems. This latter innovation can be the focus of agricultural extension for a whole community and greatly facilitate the work of field staff.

The extension service is using the various mass media more and more, but of greater significance is better understanding and more efficient use of the various methods, each of which has unique value and place in any extension programme. A large number of local newsletters are published, often initiated by our staff to be taken over by volunteers later. These publications usually start as a cyclostyled single sheet which can have only limited visual attraction; but often from this humble origin imaginative and attractive productions grow, which are avidly read and play an important part in local communication. Newsletters seem to be a more significant medium in ranching areas where they provide a link with distant neighbours with whom personal contact is infrequent.

It is reported that farmers' wives are more likely to read a local newsletter than their husbands and publishers bear this in mind when planning and directing the material.

The local and national press are used as much as possible and there is good liaison between our officers and the provincial newspapers.

In the African areas some modest beginnings with newsletters are gaining ground in the Purchase Areas and the African Times and Kunzwa are widely distributed throughout the whole country. While these newspapers may be read, it is less certain whether the messages they bring are comprehended. There is a paucity of reading matter for Africans who may seek to read primarily to exercise their literacy. Literacy has important connotations of status in their society. The publishers of the written word directed at rural Africans need to know more about the comprehension of material and learn how to present the written word in acceptable and effective form. The Department is sensitive to this problem, uses limited vocabulary in its publications for tribal farmers, and keeps abreast of the all too little research into this important subject.

An increasing number of radio programmes are directed at the farming community particularly those sponsored by commerce. Radio is particularly effective in announcing timely reminders, which this department issues. European farmers seem to find this a very useful service.

This medium is also increasing in extension value in African areas, and seems to be more effective than the Press, allowing for the fact that there are still relatively few people who have access to a radio set. The regularity of programmes and the reception of a message by the whole family, at home, increases the likelihood of messages being accepted. However the effectiveness of radio as a vehicle of extension could be greatly enhanced by greater use of material with local interest. With only two national channels operating it is difficult to develop local themes, but nonetheless the principle is being subscribed to within the limits of present circumstances.

Films too are used to good advantage, but the same stricture applies: there is a paucity of material which uses the local scene, and the use of local material is an essential educational link when it is planned to make use of relatively sophisticated media such as films.

Each province will soon have its own mobile training unit to support its local extension programmes. These units carry a range of projection equipment but already attention has been drawn to the fact that relatively few films are available nowadays. Important film libraries have closed at the same time as our demands have increased. It is therefore encouraging to note that the Information Department is concerning itself with the production of low budget films and that these can be used to promote agricultural extension. Liaison in this business has been established.

A large number of shows have been organized and staff are gaining knowledge of how shows should be used to best effect. When exhibits are side-by-side with those of Commerce, which are usually very attractive and colourful, the challenge is great. It is necessary that our exhibits be imaginative and entertaining if they are to have any message at all and stimulate any subsequent action.

There is improved understanding between field staff and officers of the Co-operatives Branch of the Ministry of Agriculture. Established co-operatives are running well and it is to be hoped that the means whereby more can be formed will be available soon. Some privately organized co-ops. are emerging.

It is also satisfactory to note that Co-ops. are handling more of the business associated with loans. This work is completely incompatible with extension duties. Extension workers have a difficult enough job in establishing themselves among their clientele, and then they must maintain and protect their own image, once they are accepted. It is all too easy for this image, and the effectiveness of an officer, to be lost if he becomes identified with some of the unpleasantness that is felt in the case of the rejection of a loan application and the even more painful process of dunning. It is acknowledged that this is important and essential work, but it is generally felt to be a mismatch when linked with extension work and likely to prejudice the job of the field extension worker.

Of more practical concern is the amount of paper work that must be undertaken in connexion with the processing of loans and it is a universal cry from the field that this makes appalling inroads into the precious time of the Extension staff. The request is to be relieved of this as soon as possible. When our field officers were allocated these duties it was with the assurance that the arrangement was a temporary expedient. There is an ardent hope that these duties will not discretely find permanence in the job descriptions of our men.

Land Use Planning

Reports from the Provinces indicate that Planning is not moving forward with the same impetus as it did because of the many and varied demands on the Field Officers's time which prevent him devoting extended periods to Planning work. Including the Plans done by specialists, the overall output in the year totals 71 plans in the I.C.A.s and 50 in the Purchase Areas with a total acreage of 1,483,287 acres. To-date a total of 2,732 (43.7 per cent.) farms have been planned with an acreage of 14,913,287 (44.5 per cent.) in the European Farming Areas.

The increasing importance of our veld has been reflected in the investigational work of Planning Branch. It has assumed responsibility for Bush Control Demonstration Plots and been trying to establish an objective way of recording carrying capacity. Already, from these studies advances have been made. The impact of wild life on carrying capacity has been appreciated and will be studied further in the coming year in collaboration with the Department of Wild Life.

Investigational work has continued into the work study aspects of Flue-cured Tobacco, Groundnuts, Cotton, Maize, Coffee and Deciduous Fruit. This reflects the wide range of studies now

carried out to ensure that our Field Staff are supplied with the information they require in their day-to-day extension operations.

Farm Management Discussion Groups completed yet another year of records. The number of co-operators was 80 per cent. of the anticipated level and the number of clubs 73 per cent. of the anticipated level. This is very satisfactory co-operation, and indicates that the co-operators reap a considerable amount of benefit from this work, and its value to the extension service is becoming greater as more and more processed data becomes available to field staff in an understandable and useful form.

ENGINEERING

Farm machinery

Two forms of training have been undertaken: a reasonably intensive course at our training centre at Domboshawa and a shorter, less detailed course, given by a mobile unit in the field. The former have been directed towards our field staff, European farmers, their managers and assistants and their tractor drivers, and African farmers who have, or intend to purchase, tractors and ancillary equipment. The latter is directed towards the training, by means of short courses, of African farmers in the field and is principally intended for training on oxen and ox equipment.

At Domboshawa eight courses have been held for departmental field staff and eight for farm staff, with a total attendance of 150 trainees. The mobile engineering training unit staffed with a technician in charge and four Extension Assistants with the necessary equipment, have given 46 courses on the use of ox-drawn equipment to 456 African farmers and 15 staff, and a further eight courses on tractor and tractor-drawn ploughs for 81 African farmers and 15 staff. This latter type of training is to be expanded.

The Ploughing Association of Rhodesia, an organization of farmers and others interested, has done a great deal to propagate good ploughing techniques and machinery maintenance and deserves praise for what it has done and is doing.

I wish to express my appreciation to the Standing Committee on Agricultural Mechanization for their help and support in the past year.

Farm Building Section

With the need for farmers and particularly tobacco farmers, to diversify and study the disadvantages and advantages in producing alternate crops, there has been a heavy demand for advice on the buildings and structures involved. Attention has therefore been concentrated on off-the-field crop drying, processing, handling, storing, and livestock feeding to the virtual exclusion of all other work. A trend that has become apparent is the ability of the farmers concerned to go in for expensive, but profitable installations.

Farm Machinery Development and Tillage Investigation

Depth of ploughing, frequency of ploughing, and rough tillage combined with wheeltrack planting are under trial, only the first being carried out at more than one station. The results to date are promising, but this work must continue to obtain statistically valid results. A number of other trials must be carried out during the coming years on different soils under various climatic conditions.

A wide variety of knapsack sprayers were tested on behalf of the Cotton Growers' Association. Of 15 types of sprayers tested, four were able to pass the standards laid down. One of these sprayers is made by a Rhodesian firm which, by modifying and improving the machine to comply with the standards, has captured a major share of the local market and has been a most successful export. Farmers, armed with the report of the tests, are now able to select a satisfactory machine and avoid those which although probably popular, have been less reliable and thereby caused crop losses.

TRAINING

A normal induction and in-service training programme, unhindered by drought emergencies, has been accomplished during the year. Of the officers who joined the Department, 19 were inducted via short courses in survey techniques, air photo interpretation and general orientation at Head Office.

Major emphasis of courses in the programme, organized by Training Branch (apart from Mechanical Conservation, Land Use Planning and Farm Management) were in Irrigation and Shona. The former related to the "priority" Farmer Irrigation Fund Scheme while the latter courses were designed to enable Tribal Area staff to be more proficient in vernacular communication.

Forty-three Extension Assistants were inducted at Domboshawa during February, prior to Provincial field postings.

Training Institute programmes have expanded considerably in numbers of courses and in attendances. The two major emphases in training during the year at Institutes have been conservation education courses for tribal leaders and teachers and technical refresher training for staff. Two hundred and nine courses were prepared and implemented on a wide variety of topics. One thousand six hundred and thirty-one Conex staff and 7,344 people mainly from tribal areas attended. Nearly 24,000 trainee/training days were held. Although this is a very good achievement, capacity of present training facilities is nearer 45,000 trainee/training days, presently unattainable due to insufficient funds being available from revenue votes. However the programmes of Alvord and Domboshawa have been very full.

One of the reasons for the increased attendances by farmers has been the excellent operation of the fleet of six buses which have run over 104,000 miles during the year. Twenty thousand passengers and more have attended courses, undertaken visits, gone to field days and training activities due to the availability of these buses, kindly donated by the Freedom From Hunger Campaign.

The Mobile Training Units, also donated by the Freedom From Hunger Campaign, became operational during the year, providing a variety of traning aids and projectors in support of local training programmes of district staff. Over 62,000 people have been contacted by these units and with three others becoming operational in the near future, their vast potential for good can be envisaged.

At provinces and in districts training has been designed to meet local needs. Training courses have been more specific this year, the subject matter relating to current problems, rather than general and over-all topics.

It is usual for senior staff to train their subordinates in the local situation and avoid the necessity of sending them to an institute or bringing in specialists for subject matter training best dealt with at district level. However it must be recorded that some officers are unable to fulfil their obligation to train others because of intervening duties which claim immediate priority but leave a deficiency of knowledge among large numbers of junior staff.

There have been considerable demands upon staff, particularly Training Branch, to provide training for the leaders of youth and womens' organizations. In rural areas the affairs of the community are much interwoven with agriculture and the improvement of any rural institution is helpful to the total situation. In due course the training mentioned might be provided by another agency, but at present this department is recognized as having the necessary skills.

PUBLICATIONS AND PUBLICITY

One hundred and nine articles have been written by 42 members of our staff and appeared in more than 10 publications. (Details in Appendix II.)

A wide range of activity has been evidenced by the small but vigorous Publications Section of Training Branch. Twenty-four new radio scripts, including lessons and discussions, have been prepared and broadcast in two vernacular languages. Nearly 500 Farming Reminders have been issued, and used in the farming and daily press. A working script for production of a film has been drafted. Taped lessons have been recorded for use in Mobile Training Units. Thousands of pamphlets and handouts have been distributed for use by farmers. The Extension Officer's Handbook is being revised in its entirety.

New ventures in publication include printed pamphlets on technical subjects, conservation education, and farm costings. Support has been given to newsletter production, outstanding of which has been "The Western Trust" published in Matabeleland.

Of particular interest, has been the production of "Bush Encroachment", a colourful instructive booklet, part of a campaign to improve the veld.

YOUTH EXTENSION

There have been spectacular developments in youth programmes. About 10,000 young people are engaged in activities in over 300 clubs affiliated to or on probation with the Association of Young Farmers and Natural Resources Clubs. Ninety per cent. of members and clubs are African, boys and girls in tribal areas. These clubs are serviced by specialist staff as well as by enthusiastic field staff. Sixteen courses and a major rally have provided leadership training for hundreds of members and leaders. A disquieting feature, though, is the lack of trained voluntary leaders which has always been a problem. As club numbers grow, it becomes more acute.

Schools have shown considerable interest in a five-fold programme offered by youth extension specialists. Over 70 schools have used lectures and

film shows on "Conservation of Natural Resources". Over 100 schools have expressed interest in a school grounds tree identification project—13 high schools have participated in a course "The African and His Agriculture" involving lectures and field visits.

Thirty "A" level students supported the innovatory "field study" camp and further interest has been stimulated. Teachers all over the country have attended various courses, with the emphasis on "African Agriculture".

TRAINING OF WOMEN

In our agricultural sphere we are training almost as many women as men. Our training branch is in constant demand to train women for leadership of voluntary groups, to train women as trainers of other women.

The necessity for technical advice on the preservation, preparation and presentation of home-grown foodstuffs is being met by the production of suitable leaflets for distribution to European and African women's groups, and by the provision of information via lectures and demonstrations.

It is considered that further thought and action should take place regarding the provision of a worthy "home economics" service for the women of Rhodesia.

EXTENSION RESEARCH

The anthropologist who is Conex Extension Research Officer has had demands for his services throughout the country, by other Ministries as well as this Department. The increasing awareness of the value of his specialistic knowledge and advice is shown in the variety of surveys or investigations called for by field officers; cattle holdings in Chinamora Tribal Trust Land; Que Que Tribal Trust Land holdings; Copper Queen African Purchase Area Cotton Survey; Tribal Tenure problems, Bikita; Fertilizer usage, Nyanyadzi; and Extension problems, Tjolotjo.

His services have been in demand on working parties: S.A.R.C.C.U.S. Symposium on traditional systems of land tenure to be held in Salisbury in May, 1968; the Departmental investigation into extension policy following on the passage of the new Tribal Trust Land Act; the Standing Committee on Agricultural Statistics.

LAND TENURE ADVISORY SERVICE

During the year work has entailed determination of the number of entrants annually required by the European section of the farming industry to replace losses by death, failure and departure from farming. The minimum figure is estimated to be 380 and does not cater for any growth in the farming population.

It is unlikely that this number will be found from among Rhodesian school leavers and highlights the importance of immigration.

The Land Tenure Officer visited France and studied that country's new approach to making farming an attractive career.

There is an increasing demand for advice about entry into farming and farm purchase, tenant farming schemes and private leases.

An encouraging improvement has occurred in leasing practice: the inclusion of a schedule of the state of the property, a good husbandry clause, and provision for arbitration.

GENERAL AGRICULTURE AND LIVESTOCK

Generally the season was excellent. After a false start, soaking rains fell in December and some replanting was necessary. However there was rectifying compensation when good rains continued later than usual and late planted crops did well.

Some local drought was experienced at Shamva, Bindura to Glendale and at Mtoko.

Field Trials and Demonstrations

The analyzed results of critical trials are not available at time of writing. These will be published as usual in December. The trials are listed in Appendix VIII.

One thousand four hundred test demonstrations were conducted in tribal areas, planted on 1,087 acres in the following percentages:

Grain sorghum	38.1	
Maize	29.7	
Groundnuts	10.3	
Cotton	8.7	
Oriental tobacco	3.5	
Miscellaneous (rapoko, rice, sunflower *et. al*)	9.7	(See Appendix IX. T.1.)

Observation suggests that single crop test demonstrations, having served good purpose, could be replaced with demonstration of whole farming

systems and this trend is well under way. There are also indications that acceptance and adoption of the systems demonstrated could be stimulated by competitions for African farmers.

A disappointing aspect of the demonstration programme is lack of finance for work in Purchase areas, where adoption of improved systems is most likely to be quickly achieved. This situation has come about as a result of the prohibition to use African Development Fund moneys in Purchase areas. It is a matter of urgency that funds be found somewhere for this essential demonstration work in Purchase areas.

Crop Production

An increased acreage of maize was planted and well husbanded to yields of 25 to 30 bags, and 40 to 50 bags per acre under supplementary irrigation. In Matabeleland there was a 130 per cent. increase in the acreage of maize irrigated and this increasing trend is likely to continue. In African areas there was a great improvement in the understanding of the maize crop, the use of hybrid seed and management through the growing season to harvest.

Sorghum grew well in the Sabi valley to average 15 bags per acre. Good yields were also obtained elsewhere, particularly in the African areas of Sanyati and Chenjiri north of Gatooma. A promising variety, Framida, has shown itself to be susceptible to damage by *Helminthosporum* spp. and American bollworm. The European-grown crop near Gatooma was attacked by aphids and yields greatly reduced.

In the African areas groundnuts, a traditional crop, grew well, with surpluses for sale. It is suited to peasant farming where hand labour provides the best means of cultivating and harvesting. At present few European farmers grow groundnuts, but price increases are attracting more interest in the problems of large acreages, curing techniques and mechanization of the crop.

Some advance in Soyabean growing can be reported: 6 to 10 bags per acre were obtained from a fairly large planting at Gatooma/Hartley. With mechanization possible it is likely that there will be an increased acreage of this crop in the coming year.

Wheat acreage has increased, mainly in the lowveld. Rust has not been the problem it has been in previous years, but the depredations of rats and queleas have reduced yields. However, with the advent of the Farm Irrigation Fund many loans are being taken with an eye to this winter crop and a substantial increase in the acreage grown can be anticipated. Further, it is not over-optimistic to contemplate Rhodesia's self sufficiency in wheat.

Potatoes were in adequate supply throughout the year, but there was a shortage of first grade in Matabeleland due to drought.

Grown mainly for essence, and direct local retail, oranges have been of poor colour this year, due to extended periods of cold weather.

Apple growing is being consolidated rather than expanded and a new type of "Granny Smith" is being tried out at Inyanga. It is likely that the country will be self sufficient, as far as peaches are concerned in the coming season, many vines of mostly wine type grapes have been planted and more expansion is planned.

There has been a great increase in the acreage planted to cotton. Crops were grown for the first time in areas which had previously been regarded as unsuitable for cotton. Where the crop was well managed, particularly with regard to efficient spraying, yields of 2,000 lb. per acre were common. In areas with high summer rainfall or where summer supplementary irrigation was used yields of up to 3,000 lb. per acre were obtained.

The application of boron has increased yields and improved the quality of the cotton crop. New compound fertilizers, which include boron, are likely to be generally used in all cotton growing areas in the future.

The immediate limiting factor to the further expansion of this crop is likely to be labour shortage. Hand picking requires a pair of hands to an acre and it may be that, until mechanical harvesting is established, the next few seasons will see the development of contract picking.

In the far north, the Zambezi Valley has been shown to be eminently suitable for growing cotton under irrigation. Cotton grown at Gutsa has excellent lint quality and staple length. Variety trials are planned for this area.

Some African areas highlight the strange problems that are encountered in extension work: some well-grown cotton crops are only partly harvested, pounds' worth being left, ungathered, in the lands.

The Coffee Growers' Association, which mostly caters for growers in Manicaland now has 66 members. In 1966, 375 acres were cropped to produce 155,000 lb. of coffee. In addition 88

African growers cropped 25 acres and obtained 2,500 lb. in the same year. The total acreage to coffee has nearly doubled and forecasts for the present season are promising. Last season's price was down £20 per ton but was still attractive at £340. One entire crop was sold at £401 per long ton. Co-operatives are established at Ngorima and Manga Tribal Trust Land and these should favourably influence the quality of the crop grown by Africans.

Finally it is encouraging to note that 75 per cent. of Rhodesian grown coffee is classed in the top three of eight standard grades.

A number of Chipinga farmers have contracted with Southdown Tea Estates to supply green leaf tea. Two hundred acres are planted and nurseries for a further 900 acres established. Two major companies in Chipinga have about 3,000 acres of tea producing about 1,200 lbs. of made tea per acre.

Two acres of nurseries are progressing well at Tamandayi Purchase Area, close to Southdown. In Holdenby 36 acres are planted and requests for planting material for a further 60 acres have been received. The output from Holdenby has risen from 12,400 lbs. of green leaf in 1966 to 21,200 lbs. in the first seven months of 1967, with a nett return of £100 or more per acre. Tea could give a high income to Pungwe Valley growers and make the area the wealthiest Tribal Land in Rhodesia. Forty thousand acres there are suited to tea growing and this could mean a steady £4,000,000 per year income for the Pungwe growers.

Twenty-four acres of pyrethrum are being grown commercially at Inyanga. A small plot has been tested at 1.29 per cent. pyrethrin content valued at 2s. 6d. per lb.

On the Sabi Valley Irrigation Scheme seed beans are expected to yield an average of 5 bags per acre. Seed lettuce is growing well on the irrigation schemes at Nyanyadzi, Mutambara and Umvumvumvu.

Canker affected about one third of the seed tomato crop at Umvumvumvu and yields are expected to be low.

Fodder crop production, veld hay and other bulk feeds has declined as the use of milled whole maize or cob and husk for feeding has increased.

Publicity has stimulated interest in the use of highly fertilized pastures for beef production. The tobacco farmer's interest in planted pastures has been connected with the rotational requirements of his tobacco crop; but changed circumstances are focussing attention on the productive potential of pasture and its role in whole farm economy, via sheep and beef cattle.

Dairy farmers are growing small acreages of winter oats for fodder.

Lucerne is still the most popular fodder crop grown under irrigation. Mostly fed to dairy cattle. Satisfactory yields of hay have been reported. However caution is advised in connexion with the growing of more of this crop for cash sale.

Crop diversification and servicing duties to be carried out by Conex field officers means, in effect, that they are unable to allot much of their time to tobacco. Extension in connexion with this crop is now only a very small percentage of total work. There is a tendency for tobacco research specialists to enter the field of extension.

However the topical problems of tobacco farmers are complicated and sophisticated and call for expert help, which might be more than could be expected from an Extension Officer with only in-service tobacco training. In this situation the help of the tobacco *extension* specialists is being increasingly sought.

In related connexion, atlhough many barns are idle, some furnace and flue layouts have been improved and it seems an anomaly that some farmers will pay for advice about this when the information is freely available from Wankie or Conex.

There has been a decline in the standards of grading and presentation related to lack of interest when farmers are excluded from the floors and thus deprived of the valuable stimulus of seeing their crop sold and relating their bales to prevailing demand.

During the past season hail, rapid ripening, black tobacco and white mould and labour shortage all contributed to losses estimated at 300 lbs. per acre. Quality too was disappointing and many growers have surrendered their quotas. It is believed that there will be about 1,600 growers this coming season. Quota surrender has been substantial in areas where cotton is a valid alternative crop e.g. Mazoe Valley, Sipolilo, Burma Valley.

There was a disappointing shortfall in the Burley crop and the standard of grading and presentation was low. Europeans do not grade

finely enough, while Africans grade very finely but tend to blend hands of differing grades.

A pilot collective grading and selling scheme for African grown Burley was well received by the trade, but with less enthusiasm by the growers. Nonetheless it is hoped to expand the scheme next season.

The decrease in the numbers of growers of Oriental tobacco is likely to continue this year. In Matabeleland there are now only 118 acres (115 acres being in the European area) as compared with last year's total of 517 acres. However the old established growers are improving their methods and the crop is being given supplementary irrigation in many cases.

Beekeeping

A satisfactory year produced a Rhodesian record 30 tons of honey from more than 1,500 established bee houses in the European areas.

In Bulawayo the Honey Society Co-operative, founded last year, has commenced selling honey. Wax foundations are now being made in Rhodesia, saving foreign currency. African beekeepers are increasing production of beeswax and the export of this product should be possible soon.

Pests and Weeds Inspectorate

Inspections have continued. Small infestations of water hyacinth are reported at Salisbury, Beatrice and Mangula.

The campaign to eradicate Lantana camara is meeting with limited success. Some local authorities are indifferent to the problem.

Livestock production

The season has been very favourable throughout the country. Cattle that had sojourned temporarily in the higher rainfall areas during the drought, were returned, but the nett result was a shift in population from the low rainfall areas to Mashonaland.

There is intense interest in beef production. Beef, as a topic of farming conversation, tends to command the attention formerly held by tobacco. New recruits to cattle farming are quickly adapting themselves and learning and applying modern methods. More difficult is the problem of introducing new techniques into old established beef producing areas. However many improvements are taking place: drought relief payment has been put into much needed ranch development, and many farmers have purchased cattle scales. (Money obtained from the sale of tobacco quotas, and diversification loans has been invested in cattle.) However it is possible that, in the rush to diversify, some decisions have been made hastily. Some of the inexperienced may yet "burn their fingers".

The increased demand for cattle has focussed attention on breeding stock. There is some inflation of prices for bulls and breeding stock. The current situation has highlighted the importance of the beef breeding herd and given impetus to recording as an essential tool of improved herd management.

There is an ever-increasing number of farmers participating in the Beef Recording Scheme sponsored by this Department. The processed records will not only assist each farmer to make accurate decisions re the selection of breeding animals, but when collated nationally these can be the basis for future planning. The immediate problem is one of processing the considerable data that is collected. For this more staff is required and arrangements are in hand to do some of the work by computer to ensure a quick feedback of information to the farmer.

As evidence of the "new look" in cattle farming winter supplementary feeding is now generally accepted as necessary and economic, whereas up until now it has usually been regarded as an emergency measure only. With improved feeding practice established there is every promise that calving and weaning percentages will improve. However guidance will be needed to ensure that the most economic sources and levels of supplementary feed are used.

Progress in the fattening of cattle has been checked by the high price of feeders which has made it only marginally, if at all, profitable, except for the larger enterprises and breeder-feeders. However some contractual arrangements for the supply of animals are being made between breeders and feeders in order to ensure continuity. Again the pressures of this situation results in indiscriminate buying when what is required is careful selection of suitable animals.

Africans have become very interested in fattening, as indicated by the increase in the numbers of cattle being pen-fed by the "Stubbs" method, from about 2,000 last year to 5,490 this year. A trade has developed in maize stover. It is now in demand by farmers who are pen-feeding and find

their own supply of roughage insufficient, so seek to purchase stover from neighbours. Problems are arising however. The supply of suitable animals is dwindling. The number of oxen drawn off for fattening is likely to have repercussion in shortage of draft, particularily at critical times in the cropping calendar.

However, it must be recorded that the advent of pen fattening in the African areas has had useful secondary benefits: a great improvement in the understanding of cattle nutrition, the result of closely handling the animals; improved relations between extension worker and farmer, fostered in their mutual concern for the success of the project, with growing confidence in the guidance of the extension worker on the one hand and better understanding of the farmer and his problems on the other; the Veterinary Department are satisfied that the dipping exemption extended to cattle fattening in pens, has not been seriously abused. Generally, there seems to be a welcome change in the attitude of many African farmers, away from the traditional concept of cattle possession as wealth to the appreciation of cattle as means of obtaining regular income.

Smaller milk producers have left the dairy industry in a steady flow and larger producers have expanded their operations proportionately. The level of management efficiency is improving. Insufficient farm-produced feed is a major problem and the fact that, in some cases, dairying is being carried on in unsuitable areas. The swing to emphasis on beef in recent years is having effect on dairy herds where there is again a shortage of breeding stock.

Closely behind the interest in beef cattle is interest in sheep. With attractive prices for lamb and mutton, sheep are an attractive proposition, especially on smaller farms and farms with improved pastures. Self-sufficiency is at hand and price reductions may come with it. Producers are being warned accordingly. Some farmers are investing in dual-purpose sheep as insulation against price fall. Where a farm has suitable pastures this could be wise investment. Breeding stock is in short supply and imports have been necessary (see Appendix III).

Generally the management of small flocks is poor, there being so little capital invested that the enterprise hardly merits attention. On the other hand large flocks represent substantial capital commitment and therefore receive the close attention such investment merits and management is of a high standard. Small flocks are not encouraged as, when considered in the whole farm enterprise, they can be a small but steady drain on profits because of indifferent management.

As in the case of dairying, pig production appears to be expanding in larger enterprises where there is highly efficient management, much of which is supported by the excellent services of the Pig Industry Board.

Increasing interest in pigs is reported from the Tribal Areas. Matabeleland has a vigorous Pig Co-operative at Tjolotjo and an enthusiastic association of pig farmers at Gwanda who have marketed 210 and 200 pigs respectively.

Many people from the Tribal Lands have visited Henderson Research Station where they seem to be particularly impressed by Home Food Production Unit—a 1-40 acre garden with rabbits, poultry, ducks and a fish pond. Interest in small stock is also being aroused by the Freedom From Hunger Campaign. African women are particularly enthusiastic about the possibilities for a better standard of living through this kind of mini-farming.

In Matabeleland 45 farmers keep 1,500 chinchillas producing as many pelts annually. The current programme is to concentrate on improved quality of pelt rather than numerical expansion, consolidate the industry, through the sale of only top-quality breeding stock.

The Animal Husbandry Branch is involved in the Masera and Lupani grazing trials, Angora sheep trials at Shashi, the de Beers/Glenara early weaning trial and an investigation into cow mortality on the Sanyati ranches.

CONSERVATION

Soil Conservation

Protection of land in the farming areas is generally good, but there is a tendency towards substandard construction and poor maintenance. Little new land is being opened up; consolidation and diversification rather than expansion is the trend.

There is growing interest in conservation which, it is hoped, will halt the deterioration taking place, at least on arable lands.

Improvement in construction and maintenance of protective works is reported from some Purchase and Tribal areas, but others report disinterest and even resistance of the farmers, and this,

combined with pressure of work on supervising and pegging staff, has contributed to deterioration in those areas.

A further decline of about 20 per cent. in contour ridges and storm drains pegged is shown, but there has been a substantial rise in waterways and roads pegged. There has been a serious lack of follow-up between pegging and construction of protection works. To ensure that our staff do not waste their time on pegging which is not followed up, it may be necessary to introduce a charge for repegging lands.

Mechanical protection alone is quite inadequate and much remains to be done in improving the soil, methods of tillage, plant cover, etc., in short, better biological conservation is required. Investigations on tillage now under way show promise of improving the situation.

Stream bank cultivation still requires careful control, while hillside cultivation and uncontrolled opening of new lands remain problems in some Tribal areas.

An interesting development which may increase and improve mechanical protection of land is the construction of ridges by ox-drawn scoop. This is at present done in a desultory way in isolated areas, but its possibilities have been brought into the public eye by the ingenuity of the Extension Assistant at Msengesi.

There has been greatly increased interest in veld management in the farming areas as a result of the recent droughts in the south-west, veld improvement research findings and, last but not least, topical controversy on methods of veld management. This has done a tremendous amount of good and highlighted the need for good veld management. Combined with this, farmers are now beginning to pay attention to the control of bush encroachment, which is serious in some areas. Drought has also focussed the need for the provision of sufficient watering points to enable the veld to be utilized properly to full advantage. Insufficient water points and dip tanks have also played havoc with the veld and soil due to excessive concentrations of livestock.

In most Tribal areas the state of the veld, its denudation and the bush encroachment taking place gives cause for concern. Overstocking, overgrazing, cultivation of grazing areas and other malpractices all contribute to an appalling situation. There is urgent need for a solution to this problem which is a grave threat to the soil.

Water Conservation

The Farm Irrigation fund has created considerable interest in water conservation for irrigation in European areas. This interest is much greater in some areas than in others. With the recent extension of the use of funds for provision of water supplies for stock, farmers in the cattle producing areas will be able to take advantage of the scheme and better veld utilization will be achieved.

There has been only a slight increase in the total number of dams built. Their aggregate capacity in each Province, other than Matabeleland, is the same as the capacity achieved last year. In Matabeleland, due to the Drought Relief and Farm Irrigation Fund moneys, there has been a 50 per cent. increase in the number of dams built and a 25 per cent. increase in aggregate capacity. This should ameliorate the effects of future droughts.

Thirty-two piped water schemes were installed during the year, bringing unproductive grazing land into use where natural water supplies are uncertain. The considerable number of boreholes drilled will also improve productivity and land use on many farms.

There has been a considerable change in the attitude towards conservation. At one time it was considered that water conservation was an end in itself, that water use was contrary to good conservation. It has apparently been appreciated that sound water use contributes to sound soil and water conservation and is of considerable financial benefit to the country.

Totally enclosed thin-walled concrete tanks for storing domestic water requirements from rock domes and roofs are in demand in Manicaland and have been undergoing improvement in design and construction. The improved type will be given publicity and is likely to be demanded wherever there are suitable collecting surfaces.

Government earth-moving units operating through a working account have played a large part in the construction of dams. They have built 41 per cent. of the earth dams for which our staff was responsible and of these 72 per cent. are in Mashonaland North. Due to present conditions in the industry there has been a serious falling off in wet season work, which usually consisted of bush clearing for arable land expansion.

The Ministries of Roads and Road Traffic and of Water Development, Rhodesia Railways, and Road Councils are very conservation-minded and

have been most co-operative in preventing soil loss to the benefit of various parties concerned.

IRRIGATION

Tremendous demands have been made on the extension service as a result of the opportunities for diversification being taken up through Farm Irrigation Fund loans which have provided an unprecedented stimulus towards irrigation development. To date, loans totalling more than £600,000 have been granted for the development of almost 20,000 acres of irrigable land, including the construction of storage for over 6½ million gallons of water for irrigation. (It is also noteworthy that although F.I.F. loans are not available for the purchase of sprinkler equipment, farmers prefer sprinkler to surface application.)

Irrigation Development in the Tribal Trust Land has been concentrated in Matabeleland, financed by drought relief funds held by the Matabeleland Development Council: Ingwezi, Makwe, Silalabuhwa, Chikwarakwara and other smaller schemes are developing.

Numerous investigations into farm schemes were made and reported upon in connexion with F.I.F. loans and reports on larger projects were made to the Irrigation Co-ordinating Committee. The tremendous expansion of irrigation may now call for some consolidation, particularly to give the technical extension service time to organize to the new situation. They have done sterling work. In particular in the Tribal Trust Land management of irrigation schemes has been taken over by the Ministry of Internal Affairs. It has fallen to our staff to deal with these schemes in the transition stage and they have performed an excellent service in this connexion.

In Manicaland the flow of some streams is fully committed and accurate data re flow is needed for future planning. Many of the Manicaland schemes are relatively old and funds are needed to correct canal layout and bring systems up-to-date and optimum efficiency.

CONCLUSION

A note of cautious optimism is not out of place at the end of a testing year. Many difficult decisions have had to be made by farmers in the diversification of their enterprises. First indications are that these initial steps will be successful and this Department can take some credit; its staff has worked hard and well to serve the industry at this trying time.

The solution of farm problems can be easier when farmers are attended by an extension service which can devote its whole time to assisting them. During the past year our staff has had to carry out many duties other than those that are its normal function. While these extraneous duties continue to increase it is inevitable that this will be at the expense of agricultural extension work, which will decrease proportionately.

While there has been some improvement in conditions of service these are not yet wholly satisfactory. Efforts to correct the many anomalies that affect the domestic conditions of our field staff will continue and due cognizance must be taken of the dissatisfaction that is occasioned when officers bear an unwelcome burden of duties which, they believe, are not their concern. There will be a vigorous attempt to limit this load and, if possible, shed it altogether.

It has been especially pleasing to note the improved situation in the tribal areas where relationships between African staff and local people have greatly improved. Team spirit has developed making itself shown by a better attitude towards conservation and increasing understanding of the promise of well-farmed land and properly managed stock. There is no complacency. Problems are not yet solved, but for the first time for many years there is a healthy working climate for our staff. In this more positive and pleasant environment morale is higher and technical standards are improving, and tangible results may be more and more apparent in the coming year.

There has been a step towards better understanding of our role in the community development context and relationships with other agencies have improved.

I acknowledge with thanks the collaboration and help we have received from other departments and Ministries with whom we work and, in particular, I am especially appreciative of the co-operation we have had in working with those bodies which are outside of Government: Intensive Conservation Areas, Farmers' Associations, Rhodesia National Farmers' Union, and many others. In thanking all these I assure them that this Department looks to the challenge of the future with confidence and will constantly strive to improve its service to those who work in the agricultural industry of Rhodesia.

J. H. H. LOUWRENS,

Director of Conservation and Extension.

VISITS TO OTHER COUNTRIES

1. Mr. F. B. Barnes, G.C. & E.O., accompanied by Mr. B. B. Wilson of the Work Study Section, spent one week in the Cape and two days in the Transvaal, where they studied the production and handling of deciduous fruit, giving particular attention to peaches.

   They discussed pomology, soil chemistry, pathology, entomology and food processing with experts at Stellenbosch; while in the Transvaal they interviewed horticulturists at the Roodeplaat Research Station near Pretoria, and made a one day tour of orchards west of Pretoria.

   Dr. Bloemart, Head of the Pomology, Fruit and Research Institute in Stellenbosch and Mr. E. P. Evans, Plant Breeder, are to be thanked for the assistance and co-operation afforded to these two officers who cannot speak too highly of the friendly help and discussion afforded to them by these two gentlemen and indeed by all those with whom they came into contact in South Africa.

2. Mr. G. F. Buchanan and Mr. D. B. Cormack visited South Africa where they studied fruit production and handling. See item No. 5 of this Section.

3. Mr. Chireka, an extension supervisor, has commenced a one-year study course at the Surrey Farm Institute at Merrist Wood in England.

4. Mr. J. M. Cormack attended a course on Hydrology in South Africa.

5. Mr. D. B. Cormack and Mr. G. F. Buchanan visited the Republic of South Africa where they studied various aspects of viticultural and deciduous fruit production and handling in the Western Province, and visited the Roodeplaat Research Station near Pretoria.

6. Mr. D. J. Donkin spent three months in South Africa where he attended a sheep and wool course during February to April.

7. Mr. B. H. G. Duncan attended a course at Seale Hayne College of Agriculture, and investigated farm management extension methods in the United Kingdom.

8. Mr. H. L. V. Ellis visited a number of herbicide manufacturers while he was in the United States of America, and saw some of the research into new herbicides. He also visited several universities.

9. Mr. D. M. Gammon accompanied Mr. A. P. McNab on a three-week study of Boer goats, Angora goats, Dorper sheep and performance testing in South Africa.

10. Mr. W. D. Going studied citrus production in the Transvaal and also visited the Roodeplaat Research Station.

11. Mr. R. H. G. Howden spent two days visiting irrigated rice producing areas in the Republic of South Africa during June.

12. Mr. M. A. Keech attended an international seminar on the Integrated Planning of Natural Grasslands in Delft, and also land use planning organizations in England.

13. (a) Mr. J. H. H. Louwrens participated in the S.A.R.C.C.U.S. meeting at Angola during October, 1966.

    (b) Accompanied by G. E. Rowe he attended the Conference of South African Institute of Agricultural Extension which was held at Durban in early August.

    (c) He also visited universities in South Africa at Pietermaritzburg, Stellenbosch, Pretoria and Bloemfontein on an official recruiting campaign.

14. Mr. Makore, an Extension Assistant has completed a one-year course at the Surrey Farm Institute at Merrist Wood in England.

15. Mr. A. P. McNab and Mr. D. M. Gammon spent three weeks in South Africa where they studied Angora goats, Boer goats, Dorper sheep and performance testing.

16. Mr. C. B. Metcalfe visited South Africa where he discussed land tenure and land settlement. He then went on to the United Kingdom and parts of Europe where he made 11 speaking engagements to agricultural members of the Chartered Institute of Auctioneers and Estate Agents.

17. Mr. T. A. Murton participated in:—

    (a) The S.A.R.C.C.U.S. meeting at Angola during October, 1966; and

    (b) The S.A.R.C.C.U.S. Symposium on Conservation and Education held in Johannesburg in April, 1967.

18. Miss P. Papadopoulo attended the International Symposium on Tropical Beekeeping Economy in the Malagasy Republic during April and May. She presented a number of papers.

19. Mr. G. E. Rowe accompanied Mr. J. H. H. Louwrens when they attended the conference of the South African Institute of Agricultural Extension.

20. Mr. J. Spear attended the Agronomic Conference in Moçambique as a guest of the Portuguese authorities. He presented two papers—

    (a) Tillage Investigations aimed at increasing yields and reducing unit production cost in Rhodesia; and

    (b) Progress in solving some of the mechanical problems encountered in Developing the Agricultural potential in Rhodesia.

21. Mr. A. T. Stubbs attended the 1967 Conference of the South African Society of Animal Nutrition held in Johannesburg in April, 1967.

22. Mr. R. Törnbohm attended the S.A.R.C.C.U.S. Symposium on Conservation and Education held in Johannesburg in April 1967.

23. Mr. B. B. Wilson accompanied Mr. F. B. Barnes on a study of the production and handling of deciduous fruit in South Africa. See item No. 1 of this Section.

PUBLICATIONS

	Title	*Author*	*Publication*
1.	High Yields Pay	Barclay-Smith, R.	*Rhodesian Farmer*
2.	Fruit Tour (Study Tour Report)	Barnes, F. B.	Not published
3.	High Weaning Ratio with Limited Funds	Bembridge, T. J.	*Rhodesia Agricultural Journal*
4.	Trickle Flow Irrigation	Brown, G. W. and Bedford, R. E. R.	*Rhodesian Farmer*
5.	Fruit Trees Grown at Small Cost	Buchanan, G. F.	—
6.	Notes on Chiota Tribal Trust Land	Burton, J.	—
7.	Changes in Milk Composition on Three Farms in Mashonaland	Carew, G.	*Rhodesia Agricultural Journal*
8.	Tomato Growing	Cassidy, M.	*Rhodesia Agricultural Journal*
9.	Classing and Marketing of Wool	Donkin, D. J.	*Sheep Handbook*
10.	Pen Fattening of Lambs	Donkin, D. J.	*Sheep Handbook*
11.	Artificial Grain drying (particularly of maize)	du Toit, F. P. B.	*Modern Farming*
12.	Herbicides: Report on a visit to the United States	Ellis, H. L. V	*Departmental*
13.	A Closer look at Anthill as a Dam Wall Material	Elwell, H. A.	*Advisory Note*
14.	Fires and Fireguards	Futter, N.	—
15.	Some Thoughts on Supplementary Feeding	Futter, N.	—
16.	Cattle Sale Prices	Gammon, D. M.	*Rhodesia Tobacco Journal*
17.	Beef Production Systems and the Grower	Gammon, D. M.	*Rhodesia Tobacco Journal*
18.	Supplementary Feeding	Gammon, D. M.	*Rhodesia Tobacco Journal*
19.	Beef Cattle Management Calendar	Gammon, D. M.	*Rhodesia Tobacco Journal*
20.	Marketing and Recording	Gammon, D. M.	*Rhodesia Tobacco Journal*
21.	Performance Testing—The Beef Recording Scheme	Gammon, D. M.	*Rhodesian Farmer*
22.	Choosing a Bull	Gammon, D. M. and McNab, A. P.	*Rhodesia Tobacco Journal*
23.	Growing of Groundnuts in Rhodesia	Harper, J. C.	*Rhodesia Agricultural Journal*
24.	Soyabeans	Harper, J. C.	*Rhodesia Agricultural Journal*
25.	Hazards of Over-ripe Reaping	Hayward, J. W.	*Rhodesia Tobacco Journal*
26.	Points to watch when planning your Crop	Hayward, J. W.	*Rhodesia Tobacco Journal*
27.	Preliminary Report: "Black" Tobacco Survey	Hayward, J. W.	*Rhodesia Farmers Journal*
28.	Reaping and Curing for optimum Quality	Hayward, J. W.	*Modern Farming*
29.	Tobacco Extension and its Problems	Hayward, J. W.	*Paper presented at seminar held at Kutsaga*
30.	A New Look at Rice for Rhodesia	Howden, R. H. G.	*Departmental*
31.	Fertilizers: Conversion of South African to Rhodesian nomenclature	Howden, R. H. G.	*Agricultural Handbook*
32.	Report of Field Trials and Demonstrations, 1965–66	Howden, R. H. G.	*Departmental*
33.	Rice	Howden, R. H. G.	*Modern Farming*
34.	Report on a visit to Komatipoort to Study Rice	Howden, R. H. G.	*Departmental*
35.	The Inter-relation of Social Structure, Land Tenure and Land Use	Hughes, A. J. B.	*Paper presented at the Association of Scientific Societies in Rhodesia*
36.	Cattle in Tribal Society	Hughes, A. J. B.	*The Rhodesia Stock Breeders' Annual*
37.	Ngwai Method of Building Contours	Kamudzandu, P.	—
38.	Your Cattle Management—Can it be Improved?	Kennan, P.	*Rhodesia Agricultural Journal*
39.	An early start on reaping is Important	Kille, T.	*Modern Farming*
40.	Big Burley Crops	Kille, T.	*Tobacco, New York*
41.	Efficient Organisation of Reaping and Curing	Kille, T.	*Rhodesia Tobacco Journal*
42.	Grading and Presentation	Kille, T.	*Modern Farming*
43.	Integration of Beef Cattle as a Supplementary income to Tobacco	Leonard, M. J.	*Modern Farming*
44.	A Guide to the Supplementary Irrigation of Coffee in the Eastern Districts of Rhodesia	Maiten, P. E.	Not published
45.	Irrigation of Deciduous and Citrus Fruit and Orchard Layout in Rhodesia	Maiten, P. E.	*Rhodesia Agricultural Journal*
46.	Points on Cattle Breeding for Beef Production	McNab, A. P.	*Modern Farming*
47.	Recruitment needs of the European Farming Population	Metcalfe, C. B.	*Paper presented at the Association of Scientific Societies of Rhodesia*
48.	Aim for Hundred Percent Stand	Milligan, G. A.	*Rhodesia Tobacco Journal*
49.	Disease Control Seedbeds	Milligan, G. A.	*Modern Farming*
50.	Tidying Up Before Next Season	Milligan, G. A.	*Rhodesia Tobacco Journal*
51.	White Mould Control	Milligan, G. A.	*Rhodesia Tobacco Journal*
52.	Care and Maintenance of Farm Machinery (a series of articles)	Oliver, G. J.	*Rhodesia Tobacco Journal*
53.	Bulletin on Eucalyptus	Papadopoulo, Miss P.	*Departmental*

	Title	*Author*	*Publication*
54.	Satisfactory Colony	Papadopoulo, Miss P.	*The Bee Line*
55.	Circular for all Beekeepers	Papadopoulo, Miss P.	*Departmental*
56.	Syllabus on Beekeeping	Papadopoulo, Miss P.	*Departmental*
57.	Flowering Bulletin No. 3	Papadopoulo, Miss P.	*Departmental*
58.	Beeswax	Papadopoulo, Miss P.	*Departmental*
59.	Circular for all Beekeepers	Papadopoulo, Miss P.	*Departmental*
60.	Rhodesian Trees, Shrubs and Flowers, flowering during January	Papadopoulo, Miss P.	*Departmental*
61.	Rhodesian Trees, Shrubs and Flowers, flowering during February	Papadopoulo, Miss P.	*Departmental*
62.	Rhodesian Trees, Shrubs and Flowers, flowering during March	Papadopoulo, Miss P.	*Departmental*
63.	Rhodesian Trees, Shrubs and Flowers, flowering during April	Papadopoulo, Miss P.	*Departmental*
64.	Rhodesian Trees, Shrubs and Flowers, flowering during May	Papadopoulo, Miss P.	*Departmental*
65.	Rhodesian Trees, Shrubs and Flowers, flowering during June	Papadopoulo, Miss P.	*Departmental*
66.	Rhodesian Trees, Shrubs and Flowers, flowering during July	Papadopoulo, Miss P.	*Departmental*
67.	Rhodesian Trees, Shrubs and Flowers, flowering during August	Papadopoulo, Miss P.	*Departmental*
68.	Rhodesian Trees, Shrubs and Flowers, flowering during September	Papadopoulo, Miss P.	*Departmental*
69.	Rhodesian Trees, Shrubs and Flowers, flowering during October	Papadopoulo, Miss P.	*Departmental*
70.	Care of a swarm	Papadopoulo, Miss P.	*Bee Line*, January
71.	Feeding	Papadopoulo, Miss P.	*Bee Line*, February
72.	Care of a swarm (above average)	Papadopoulo, Miss P.	*Bee Line*, March
73.	Supering	Papadopoulo, Miss P.	*Bee Line*, April
74.	Removing Supers	Papadopoulo, Miss P.	*Bee Line*, May
75.	Removing Supers (continued)	Papadopoulo, Miss P.	*Bee Line*, June
76.	Repellants	Papadopoulo, Miss P.	*Bee Line*, July
77.	Extracting Honey	Papadopoulo, Miss P.	*Bee Line*, August
78.	Care of Honey	Papadopoulo, Miss P.	*Bee Line*, September
79.	Pollination	Papadopoulo, Miss P.	*Rhodesian Farmer*
80.	How to avoid bee stings (Revision)	Papadopoulo, Miss P.	*Rhodesia Agricultural Journal*
81.	Dealing with the bee swarm (Revision)	Papadopoulo, Miss P.	*Rhodesia Agricultural Journal*
82.	Enemies of Bees (Part II) (Revision)	Papadopoulo, Miss P.	*Rhodesia Agricultural Journal*
83.	Apiary (Revision)	Papadopoulo, Miss P.	*Rhodesia Agricultural Journal*
84.	Cropping Honey (Revision)	Papadopoulo, Miss P.	*Rhodesia Agricultural Journal*
85.	Milisa Solar Wax Extractor	Papadopoulo, Miss P.	*Rhodesia Agricultural Journal*
86. 87.	Simple Beekeeping / Beeswax	Papadopoulo, Miss P. and Robertshaw, J. E.	*Departmental*
88.	Report on the International Symposium on Tropical Beekeeping, Malagasy Republic, May–June 1967	Papadopoulo, Miss P.	*Departmental*
89.	Bush Encroachment	Robertshaw, J. E., Cleghorn, W. B. and Ivy, P.	*Departmental*
90.	Groundnuts	Robertshaw, J. E.	*Departmental*
91.	Aflatoxin—a poisonous disease	Robertshaw, J. E.	*Departmental*
92.	Setting and Adjusting Your Groundnut Sheller	Robertshaw, J. E. and Oliver, G. J.	*Departmental*
93.	Figures about water for Irrigation	Seagrief, E.	*Departmental*
94.	Notes for Irrigation	Seagrief, E.	*Departmental*
95.	To Diversify or Not	Seagrief, E.	*Departmental*
96.	Henderson Research Station—food production for the family on an 80-acre intensive farm unit	Smith, G. A.	*Departmental*
97.	Henderson Research Station—Progress up to 1967 on the 80-acre intensive farm unit	Smith, G. A.	*Departmental*
98.	Tillage Investigation aimed at increasing yields and reducing unit production cost in Rhodesia	Spear, A. J.	*Paper presented at the Agronomic Conference in Moçambique*
99.	Progress in solving some of the mechanization problems encountered in developing the agricultural potential in Rhodesia	Spear, A. J.	*Paper presented at the Agronomic Conference in Moçambique*
100.	How to Decide Optimum Tobacco Acreages	Stocks, J. L.	*Rhodesia Tobacco Journal*
101.	Points to Watch when aiming for High Yields	Stocks, J. L.	*Rhodesia Tobacco Journal*
102.	New Hope for Tribal Land Farmers	Törnbohm, R.	*Modern Farming*

APPENDIX II (*continued*)

	Title	*Author*	*Publication*
103.	Conditioning and Baling Oriental Tobacco	Wilson, G.	*Rhodesia Tobacco Journal*
104.	Oriental Tobacco	Wilson, G.	*Agricultural Handbook*
105.	Shabani Farmer Mechanises Supplementary Feeding	Williams, R. D.	*Rhodesian Farmer*
106.	Farming 1968—a compilation of modern agricultural practices	Winkfield, R. E.	*Departmental*
107.	Revision of the R.T.A. Work Study Manual	Planning Branch	—
108.	Weekly Tobacco Bulletin	Tobacco Branch	—
109.	Preparation of Material and Participation in various R.B.C. Programmes	Tobacco Branch	

In addition to the above items, many articles were written by our staff, both European and African, which were published in various newspapers and district publications.

J. E. ROBERTSHAW,
Publications officer.

APPENDIX III

LIVESTOCK IMPORT PERMITS ISSUED— 1st OCTOBER, 1966 TO 30th SEPTEMBER, 1967

COUNTRY OF ORIGIN

	South Africa	*Zambia*	*U.K.*	*U.S.A.*	*France*	TOTAL
Bulls	209	—	—	2	2	213
Cows and Heifers	321	2	—	—	18	341
Calves	38	—	—	—	—	38
Sheep	2,793	600	—	—	—	3,393
Pigs	14	—	—	—	—	14
Goats	55	—	—	—	—	55

APPENDIX IV

TRAINING

Courses run by Provincial Training Instructors

Institute	Number of courses held	Training/Trainee days	Participants	
			Conex staff	Others
Alvord	71	9,603	557	3,908
Domboshawa	70	6,878	546	1,497
Kayisa	21	2,934	115	645
Rowa	40	4,050	289	1,236
Midlands*	7	475	124	58
TOTAL	209	23,940	1,631	7,344

* No institute.

*** Courses organized at district and provincial venues**

Province	Number of courses	Attendance
Mashonaland North	9	408
Mashonaland South	10	209
Manicaland	10	211
Midlands	20	278
Matabeleland	9	90
Victoria	24	421
TOTAL	82	1,617

* The following are some of the subjects dealt with: Animal Husbandry: beef production, cattle handling, pig farming. Burley Tobacco. Oriental Tobacco. Farm Mechanization: tractor and ox ploughing. Conservation: pegging, veld management, pastures and livestock, bush control. Grain grading. Irrigation. Fish farming. Cotton pest control. Extension Methods. Co-operatives. Programme planning. Community development. Public speaking. Bee-keeping. Home crafts.

APPENDIX V

SOIL CONSERVATION

Province	Period	Contour ridges and storm drains			Waterways pegged—miles	Roads pegged—miles
		Miles		Acres protected (estimated)		
		Pegged	Constructed (estimated)*			
Mashonaland South	1966–67	1,435	1,243	32,722	98	260
	1965–66	2,300		32,319	101	82
Mashonaland North	1966–67	4,999	3,459	57,607	56	113
	1965–66	5,351		61,069	104	141
Midlands	1966–67	1,168	500	7,708	97	76
	1965–66	1,505		20,427	86	68
Matabeleland	1966–67	554	294	10,702	373	29
	1965–66	625		12,964	34	60
Manicaland	1966–67	1,699	1,194	17,427	67	41
	1965–66	1,757		21,889	3	11
Victoria	1966–67	1,259	991	11,334		
	1965–66	2,079		14,220	84	—
TOTALS	1966–67	11,114	7,682	137,500		
	1965–66	13,617		162,888	412	362

* These figures are included this year for the first time in order to determine the follow-up on pegging.

WATER CONSERVATION

Province	Period	Number of dams constructed	Capacity in million gallons	
			Total	Average
Mashonaland South	1966–67	21	390·0	18·6
	1965–66	28	492·1	17·6
Mashonaland North	1966–67	97	479·6	4·9
	1965–66	96	469·0	4·9
Midlands	1966–67	31	738·0	23·8
	1965–66	63	783·0	12·4
Matabeleland	1966–67	34	7,003·4	206·0
	1965–66	23	1,899·0	82·6
Manicaland	1966–67	64	102·0	1·6
	1965–66	46	29·7	0·6
Victoria	1966–67	33	15·4	0·5
	1965–66	51	37·5	0·7
TOTALS	1966–67	280	8,728·4	31·2
	1965–66	307	3,710·3	12·1

Note.—Weirs are included.

DAMS CONSTRUCTED

Province	Farmers and contractors				Government units	
	Earth dams		Weir		Earth dams	
	Number	Percentage	Number	Percentage	Number	Percentage
Mashonaland South	12	57	3	14	6	29
Mashonaland North	20	20·6	3	3·1	74	76·3
Midlands	11	35·5	1	3·2	19	61·3
Matabeleland	12	40	14	46·7	4	13·3
Manicaland	57	89	7	11	—	—
Victoria	33	100	—	—	—	—
TOTAL	145	53	28	10	103	37

LIST OF CRITICAL TRIALS CARRIED OUT BY THE DEPARTMENT OF CONSERVATION AND EXTENSION DURING 1966–67

Type of trial	Manica-land	Mashona-land North	Mashona-land South	Matabele-land	Midlands	Victoria	Total
Maize variety	—	5	—	—	1	1	7
Soya bean variety	1	2	—	—	1	—	4
Cotton variety	1	3	—	1	—	1	6
Cotton nitrogen and time of application	—	3	—	1	—	—	4
Grain sorghum fertilizer	—	1	—	1	1	1	4
Harvester termite	—	—	—	—	—	1	1
Lime and fertility	2	—	1	—	1	—	4
Bush control	—	—	—	3	—	—	3
Sunflower variety	—	—	—	—	—	1	1
Rotational trials	—	1	—	—	—	—	1
Rice	1	—	—	—	—	—	1
Vlei Drainage cropping	—	—	—	—	—	—	Nil
Groundnut variety	1	1	2	—	—	1	5
Rapoko population and fertilizer	—	—	1	—	—	—	1
Silage Sorghum Variety	—	1	—	—	—	—	1
Cotton spraying	—	1	—	—	—	—	1
Fertilized pastures	—	1	—	—	—	—	1
Grain sorghum variety	—	—	—	—	—	1	1
TOTAL	6	19	4	6	4	7	46

Crop	Manicaland			Mashonaland North			
	Number plots	Acres	Total bags	Number plots	Acres	Total bags	Num plo
Maize	62	36·0	745	72	67·0	1,388	
Grain sorghum	39	25·0	288	83	66·0	892	
Groundnuts	33	18·0	88	26	27·0	92	
Ropoko	2	1·0	13	—	—	—	
Munga	3	2·5	28	—	—	—	
Cotton (lb.)	23	13·0	24,269	33	29·0	39,914	
Beans	11	9·0	42	1	1·0	6	
Sunnhemp	—	—	—	3	3·0	15	—
Wheat	11	7·5	85	—	—	—	
Nyimo	—	—	—	—	—	—	—
Cowpeas	—	—	—	—	—	—	—
Rice (Paddy)	1	0·25	¼	—	—	—	
Soyabeans	—	—	—	—	—	—	—
Sunflowers	—	—	—	—	—	—	—
Sweet potatoes	—	—	—	—	—	—	—
Velvet Beans	—	—	—	—	—	—	—
Burley tobacco (lb.)	—	—	—	4	4·0	£524	—
Oriental tobacco (lb.)	11	2·7	4,247	—	—	—	
Dolichos beans	—	—	—	—	—	—	—
Sesame	—	—	—	—	—	—	—
Pumpkins	—	—	—	—	—	—	—
Tomatoes (lb.)	—	—	—	—	—	—	—
Potatoes (pkt.)	5	1·25	240	—	—	—	—
TOTAL	201	116·2	—	222	197·0	—	27

TABLE 1

T DEMONSTRATION PLOTS IN T.T.L.s.

ber s	Mashonaland South		Matabeleland			Midlands			Victoria			Total			Gross value at market prices
	Acres	Total bags	Number plots	Acres	Total bags	Number plots	Acres	Total bags	Number plots	Acres	Total bags	Number plots	Acres	Total bags	£
8	74·75	1,396	76	75·0	691	82	75·0	1,010	26	17·5	328	416	345·25	5,558	5,558
2	60·5	664	512	153·0	1,140	69	57·0	484	118	92·5	800	533	454·0	4,268	5,335
6	26·75	125	1	1·5	2	17	11·0	43	21	12·5	76	144	96·75	426	1,704
5	13·75	126	—	—	—	3	1·2	7	7	4·0	42	37	19·95	188	282
4	2·5	53	—	—	—	1	1·0	7	6	3·0	6	14	9·0	94	141
0	14·0	20,900	—	—	—	11	6·6	14,925	35	32·0	37,995	122	94·6	138,003	3,450
1	0·5	¾	1	0·5	Nil	1	0·1	1	1	0·5	6	16	11·6	55	165
	—	—	—	—	—	1	0·1	¼	—	—	—	4	3·1	15	34
1	1·0	14	—	—	—	—	—	—	—	—	—	12	8·5	99	334
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	21	10·5	21	—	—	—	1	1·0	1½	22	11·5	23	46
7	1·75	13	—	—	—	—	—	—	1	0·2	3½	9	2·2	17	53
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	9	10·0	60	—	—	—	9	10·0	60	90
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	4	1·0	820	8	5·0	N/A	620
	0·4	140	—	—	—	—	—	—	37	11·5	7,010	49	14·6	11,397	8,550
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	5	1·25	240	90
	195·90	—	251	240·5	—	194	162·0	—	257	175·7	—	1,400	1,087·3	—	26,452

Estimated mean gross value per acre . £24 6s. 6d.
Estimated mean cost per acre . . . £11 1s. 6d.
Estimated mean gross margin per acre . £13 5s. 0d.

TABLE 2

RECORD OF GENERAL EXTENSION WORK

Province/Group A.P.A./T.T.L.	Mashonaland North	Mashonaland South	Matabeleland	Midlands	Victoria	Manicaland	Total
Total number of cultivators	64,619	88,327	89,238	84,958	110,459	90,925	528,526
Number of master farmers	1,980	3,961	642	2,829	6,356	1,260	17,028
Number of master farmers qualifying during year	158	209	34	89	48	116	654
Number of master farmers in training	1,769	1,711	1,019	2,321	2,181	1,630	10,631
Number of co-operators	11,793	25,999	9,408	34,884	24,230	15,085	121,399
No. of farm carts in use	5,500	7,950	6,286	5,859	8,061	9,240	42,896
Number of farmers using fertilizer	7,845	6,392	1,094	2,351	3,289	5,975	26,946
Number of farmers' days	518	821	548	582	1,472	771	4,712
Number of farmers attending field days	21,287	32,381	6,818	30,874	51,749	15,312	158,421
Number of agricultural shows	5	6	14	14	27	9	75
Number of training centres in use	90	82	43	146	139	83	583
Number of training centres constructed during year	2	—	5	1	1	2	11
Number of tractors	211	201	91	119	67	85	774

APPENDIX IX (*continued*)

TABLE 3

ANIMAL HUSBANDRY EXTENSION

Province/Group A.P.A./T.T.L.	Supplementary Feeding				Pen Feeding T.T.L.						Number of Farmers marketing through C.S.C. COLCOM			Number of Farmers dosing	
	A.P.A.		T.T.L.			Grade obtained									
	Number making hay	Number making silage	Number making hay	Number making silage	Total cattle in pens	C. I	C. II	C. III	G.A.Q.	F.A.Q.	Cattle	Sheep	Pigs	Cattle	Sheep
Mashonaland South	249	61	697	23	1,486	2	9	30	337	56	428	8	46	576	18
Mashonaland North	98	3	79	25	437	2	—	2	2	—	120	1	9	205	89
Matabeleland	38	11	317	56	471	—	—	14	203	—	331	61	167	1,190	3,342
Manicaland	239	72	1,673	83	1,224	7	3	2	24	—	847	89	237	1,098	191
Midlands	66	52	70	93	375	—	—	2	56½	—	321	2	45	1,589	393
Victoria	483	42	6,269	138	1,497	5	8	79	439	—	1,084	766	859	3,272	2,644
TOTAL	1,173	241	9,105	418	5,490	16	20	129	1,061½	56	3,131	927	1,363	7,930	6,677

APPENDIX IX (*continued*)

TABLE 4

PURCHASE AREA EXTENSION

Province	Acreage	Total number farms alienated	Number of I.C.A.'s	Number of farms associations	Number of farm plans prepared
Manicaland	250,097	1,296	12	9	23
Mashonaland North	374,877	1,372	14	4	20
Mashonaland South	408,552	1,410	14	9	1
Matabeleland	370,260	895	20	6	8
Midlands	1,025,081	1,466	18	6	8
Victoria	671,850	1,971	18	12	18
TOTAL	3,100,717	8,410	96	46	78

ANALYSIS OF HOUR UTILIZATION BY EUROPEAN STAFF

FARMING AREAS

Province/Group I.C.A./A.P.A./T.T.L.	Victoria		Mashonaland North		Mashonaland South		Midlands		Matabeleland		Manicaland		Grand Total	Percentage
	Total	Percentage	Total	Percentage	Total	Percentage	Total	Percentage	Total	Percentage	Total	Percentage		
I.C.A. group farmers	2,219	5·2	3,346	5·6	1,915	5·4	2,763	4·9	1,826	2·9	2,351	3·7	14,330	4·5
Staff conferences	2,815	6·9	2,391	4·0	979	2·7	3,666	6·5	2,587	4·1	2,286	3·6	14,724	4·6
Courses	4,403	10·9	3,027	5·1	1,663	4·6	3,034	5·4	1,495	2·5	4,836	7·6	18,458	5·8
Inspections	1,667	4·1	2,178	3·7	2,081	5·8	1,617	2·9	1,702	2·7	1,894	3·0	11,139	3·5
Agronomy	3,685	9·1	3,646	6·1	2,356	6·6	3,385	6·0	3,563	5·7	8,809	13·8	25,444	8·0
Tobacco	1,495	3·7	1,814	3·1	1,067	3·0	1,980	3·5	88	·1	2,352	3·7	8,796	2·9
Livestock	4,404	10·8	2,567	4·3	2,716	7·7	4,505	8·0	4,801	7·7	3,794	6·0	22,787	7·1
Soil and water conservation	2,759	6·9	8,042	13·6	4,652	13·0	3,794	6·7	4,131	6·6	5,339	8·4	28,717	9·0
Irrigation	2,363	5·8	2,787	4·7	1,260	3·5	3,648	6·5	13,333	21·4	4,265	6·7	27,656	8·7
Farm planning	1,247	3·1	2,342	3·9	1,470	4·1	1,951	3·3	1,327	2·1	801	1·3	9,138	2·9
Farm management	492	1·2	474	·8	536	1·5	719	1·3	182	·3	429	·7	2,832	·9
Field day shows	1,632	4·0	1,829	3·1	1,358	3·8	1,567	2·8	2,981	4·8	1,947	3·1	11,314	3·5
Field trials	1,414	3·5	1,419	2·4	355	1·0	945	1·7	982	1·7	1,777	2·8	6,892	2·2
Census	127	·3	414	·8	321	·9	74	·1	132	·2	259	·4	1,327	·4
General extension liaison	3,342	8·2	3,951	6·7	1,560	4·3	3,531	6·3	1,750	2·8	5,504	8·6	19,638	6·2
Administration	6,367	15·8	12,798	21·6	5,707	15·9	9,607	17·0	12,728	20·4	8,302	13·0	55,509	17·5
Publications	220	·5	669	1·1	404	1·1	162	·3	711	1·1	440	·6	2,606	·8
Travel time	—	—	5,599	9·4	5,390	15·0	9,498	16·8	8,019	12·9	8,289	13·0	36,795	11·5
TOTAL	40,561	100·0	59,293	100·0	35,790	100·0	56,446	100·0	62,338	100·0	63,674	100·0	318,102	100·0

Annual Report of the Director of Veterinary Services

for the Year ended 30th September, 1967

STAFF

The insatiable demand for wide-spread professional and lay services arising from expanded beef production concomitant with deteriorations in Foot and Mouth Disease, Trypanosomiasis, Rabies and African Swine Fever, severely strained depleted staff resources. The challenge was only met by severe curtailment of all leave, suspension of minor routine service and the exploitation of staff in gross overtime in field duties; that they so successfully contained the position, without complaint, speaks well of their morale in view of their inadequate salary gradings. The recent indications of more equitable grading structures in the near future are long overdue.

Professional vacancies still stand at a total of seven in an establishment of 40 Veterinary Officers but this is of minor import compared to the loss, since the break-up of Federation, of eight senior officers with many years of local expertise and experience impossible to replace within a decade. With comparatively inexperienced officers having to fill senior posts, the overload having to be borne by a few top ranking executives is regrettably unjustifiable, as the departed senior staff could have been retained if salary increases had been given at an earlier date.

With increased starting salaries, a steady stream of recruits from the 20 veterinary bursars, now at university, should supplement the service from the end of 1967.

As these will be spread over five years, however, no immediate dramatic improvement will be effected.

The Animal Health Inspectors similarly bore the inescapable overloading with equanimity and credit but a loss of 20 out of an establishment of 101, reflected the over-all unattractiveness of this employment; 57 per cent. of this staff have five years or less service and better working conditions must be secured for this essential backbone of the service. The whittling away of fringe benefits (subsidized housing, mileage rates, etc.) has materially undermined the morale of this section.

A major advance was secured with the appointment of a training officer to create a new feeling of interest in the job amongst the lay staff and to give them greater confidence in their abilities.

Sixteen courses were mounted covering a total of 77 days instruction to 127 Animal Health Inspectors.

Five courses of instruction of Internal Affairs and African Council Dip Attendants were given to 62 Dip Attendants and 11 Councillors.

Eight courses on Veterinary Department activities and disease control at Domboshawa were attended by 85 Community Advisers and 12 Council Secretaries.

Despite an improved salary structure for Meat Inspectors, six vacancies exist out of an establishment of 19. The Abattoir service is able to function only with the re-employment of pensioners and specially trained Animal Health Inspectors. Of the six men crash trained in Glasgow in 1963, only three will remain by the end of 1967. Salary increases, as in other grades of the Service, are always a step behind those prevailing elsewhere in similar services and recruitment from outside sources is practically non-existent.

The opening of Gatooma Abattoirs in January, 1970, will necessitate a further seven inspectors.

The Cold Storage Commission has agreed to the provision of accommodation at Bulawayo for the in-service training of Meat Inspectors by the Department under the aegis of the Royal Society of Health, to start in January, 1968. An examining body has been appointed and we will turn out at least six qualified Meat Inspectors per annum but their immediate effect will be greatly nullified by impending resignations and their nine-month's commitment to military training, post graduation.

The decision to postpone erection of the new Veterinary Research Laboratories until 1970 considerably depressed the specialist staff and finalized the speedy departure of one outstanding research worker, already markedly aggrieved over his low salary grading. All major expansion of the Research Laboratories has been blocked since 1957 and temporary working space has had to be created by enclosing narrow verandas, etc., entirely unsuitable for the purpose. Accordingly a laboratory originally erected for two professional workers, two technicians and a stockman has had to house eight professional workers, one technical officer, 14 technicians and two Animal Health

Inspectors, two stockmen and the ancillary services of laboratory assistants, etc.

Similarly the Tsetse and Trypanosomiasis Branch Head Office consisting mainly of professional officers engaged in vital research, which was also to be moved to expanded premises at a new site, at present accommodates a staff of 40 in decrepit premises built originally for a total of 17 officers. Four other officers have to be housed in a condemned building, one mile distant.

Such impossible working conditions will completely negate any chance of the new salary structures retaining the present incumbents or attracting new entries.

Young scientists nowadays have perforce to make their mark in the 30-40 years of age bracket whilst at the peak of their intellectual powers and working conditions have to be optimal to attract and retain these very scarce personnel.

In the Tsetse and Trypanosomiasis Control Branch there has been little improvement in the professional staff position. One Veterinary Officer and two Glossinologist posts remained vacant. Two Glossinologists were recruited during the year but another resigned. The need for senior experienced officers remains the basic problem.

The turnover in Tetse Field Officers continued at a high level. The unsuitable type of applicant responding to the low commencing salaries and the arduous and isolated working conditions are considered to be the main contributory reasons.

The administrative staffing of the organization persists on an inadequate scale. A strong administration is essential for the success of the type of operations conducted and the major finance involved.

The Chief Veterinary Surgeon (Tsetse and Trypanosomiasis Control) and his staff successfully undertook the training of 43 lay staff in basic Trypanosomiasis duties.

A handbook entitled "Handbook for the use of Tsetse Field Staff" was prepared for training purposes and issue to all staff concerned.

The housing shortage in regard to field staff in out-stations such as Fort Victoria, Sinoia, etc., has seriously curtailed the proper usage and disposition of staff.

The provision of up-to-date Veterinary Offices on several out-stations (Sinoia, Chiredzi, Karoi) by the Ministry of Works has been one of the highlights in an otherwise trying year.

LIVESTOCK ECONOMY

The recovery in the National Herd after three years of drought has been remarkable coupled with an availability of grazing and water in the lowveld unequalled for a decade plus an over-all highly favourable season elsewhere.

Cattle census reveals an increase of 102,971 European-owned and 198,325 African-owned—a significant upsurge of 301,296 head to a new National Herd total of 4,144,457 cattle.

The off-take by the Cold Storage Commission fell markedly due to:

(a) high prices at local auction sales for slaughter stock attracting animals which would normally be consigned to the Cold Storage Commission;

(b) sales-resistance in African areas where very good crops and lack of poverty deaths in cattle removed the usual economic incentives to disposal of stock.

The lack of flow of cattle from the Tribal Trust Lands activated a highly uneconomic competition for feeder stock at European sales. Farmers turning to cattle for diversification of production are paying generally too high prices for store and feeder stock and their end returns could be extremely disappointing and threatening to the future stability and expansion of the beef industry.

Africans similarly are again re-building the framework of a disastrous over-stocking of the temporarily recovered lowveld and it would be realistic and wise to promote sales incentives now to avoid future repetitions of costly drought evacuations, etc.

The immediate promotion of special store sales in Tribal Trust Lands to ensure availability of such stock to the emerging cattle feeders in European areas is overdue.

Otherwise the immediate re-examination of the potential carrying capacity of the lowveld Tribal Trust Lands to ensure control in cattle numbers is urgently necessitated.

Management in European areas continues to improve steadily but as already mentioned, stock requirements outnumber available suppliers and auction prices, etc., have rocketed to dangerous levels.

High energy feeding of cattle has decreased in extent, many farmers preferring to sell maize rather than feed it. Lowveld farmers, especially in the irrigation blocks, are showing renewed interest in cattle feeding following sugar price depression. Major schemes involving zero grazing or limited improved permanent pasture availability with permanent feeding in stalls of sugar wastes, crop residues (cotton, soya, etc.) and lucerne to both breeding and feeder cattle are now being tackled. Many of the major lowveld ranches are opening up new winter grazing areas with water reticulation in polythene piping, the which should immeasurably increase their stock-carrying capacity.

The stall feeding of cattle in African areas is expanding widely but has its drawbacks to this Department in lack of tick control plus inspection and loading problems in the Foot- and Mouth-prone areas.

The total cattle slaughtered in 1966/67 was understandably less than last year's record when drought forced salvage measures but the usual steady increase per annum over the last decade was fully maintained.

Dairying

Stability is returning to this industry with the elimination of the small producers. The larger dairies are increasing production to cut costs per gallon; intensive feeding of bull calves, mainly Friesland, is an increasingly remunerative side line to a few, the which could be profitably adopted more generally, especially in view of the recent findings that Friesland steers give better meat carcases than most of the beef breeds.

Sheep

These have increased by 104,750 to a new total of 554,225 with a satisfying increase in a higher quality sheep especially in Mashonaland, and a heavy demand for top class rams, especially Dorpers. Greater attention still requires to be paid to efficient shepherding, regular dosing, enterotoxaemia complex prophylaxis and improved pastures to limit the grass seed penetration of skins and resultant destructive abscessation in carcases.

Sheep wintered very badly in Matabeleland, and flocks in general will have to receive much more sympathetic treatment if the sheep industry is to assume any significance therein. Low grade rams and lack of European supervision are common faults.

Pigs

Pigs continue on a sound basis but could be easily over-produced unless dietetics can give alternative protein sources to reduce feed costs. The small goods ex Colcom are highly attractive to overseas buyers but unfortunately too highly priced. More Africans are feeding pigs and, at last, realizing the necessity of permanent housing to avoid measles condemnations. An increase in the pyaemia condemnations in European pigs underlines the necessity for a higher standard of technique and hygiene at castration.

Poultry

The large commercial flocks have successfully weathered sanctions—some retrenchment was effected but they have maintained a high standard of stock and prospects are good. The economic shambles amongst the smaller producer still appertains in the face of their inability to co-operate for the good of the industry.

General

The complete restoration of normal relationship and active co-operation in the African areas noted as gradually resuming in the last report continued and the promotion of veterinary extension work in several African Purchase areas and the Tribal Trust Lands by our only African veterinarian became a satisfying feature in organized Field Days, much in demand.

The active co-operation was amply reflected in the return of prosecutions under the Law and Order (Maintenance) Act for infringements affecting this Department, as follows:

1964-65	Salisbury Province only .	2,599 prosecutions
1965-66	Salisbury Province only .	29 prosecutions
1966-67	All Rhodesia	18 prosecutions

Total prosecutions listed similarly reflect the satisfying return to peace in the absence of political agitators amongst the rural community.

	Prosecutions	*Total Fines*
1964-65	4,168	£33,336 5 0
1965-66	2,032	£8,083 10 0
1966-67	1,415	£5,687 8 0

The dearth of staff and its almost complete absorption in control duties with major decimative diseases such as Foot and Mouth, Rabies, African Swine Fever, etc., lead to many temporary transfers and stripping of stations of staff much to the dissatisfaction of many new and nervous cattle owners who could not be given veterinary assistance in their moments of need. It is obvious that

a major expansion of services must occur in the very near future for the security of the livestock industry—an average of only one veterinary surgeon to every 180,000 head of domesticated stock (excluding poultry) on such a widespread front as Rhodesia underlines the impossibility that is being asked of the profession but which it still is managing somehow to equate. It should also be borne in mind that we are being asked to maintain health in domesticated stock depastured amongst conserved species of free living wild life, reservoirs of disease non-existent in more developed lands, an ever-present and increasing threat.

Tick Life and Dipping

The number of quarantines remained at the same total as last year but the provincial incidence varied dramatically. A marked increase in the highveld followed the increase in tick populations arising from past negligence in dipping and the haphazard under-strength use of the many new organic dipping preparations, especially in European areas; such findings reflect little credit on those concerned.

In African areas, the tick position has slightly improved but varies considerably in line with the interest of the local authorities concerned.

Where dipping is being run by District Councils the control has seriously deteriorated and legislative difficulty is being experienced in placing responsibility for such failures; correction therefore is difficult.

It is obvious that a complete new approach will have to be formulated to regain our past efficiency in tick control in the African areas.

The registration of organic dips has been considerably tightened and none will now be registered for use unless a free testing service is provided locally to give results of tests within four days of submission of samples of dip-wash.

Courses of instructions for Dip Attendants, Council Secretaries and Councillors responsible for dipping in African areas have been given with resultant improvements in several districts.

Tick Survey

The Tick Survey is nearly completed and the plotting of the distribution of the various species in the country, one species per map is in hand.

The following rare species have now been identified:

Genus Rhipicephalus	*Genus Ixodes*	*Genus Haemaphysalis*
Rh. arnoldi	*I. thomasae*	*H. cooleyi*
tenderio	*theilerae*	*hoodi*
maculatus	*ugandus*	*parmata*
reichenowi	*vanidicus*	
armatus		*Genus Amblyomma*
hurti		*A. sparsum*
		lepidum

Livestock Inspections

Inspections totalled 19.3 million head examined —compared with 17.2 million in 1965-66. The erection of permanent inspection races in African areas in iron and concrete is greatly facilitating the control of stock and disease and a stock plan of such races has been formulated for distribution.

Sales

Figures for European sales are practically the same as last year. The take-off figure of 2.88 per cent. only from the African weight and grade sales—a mere 67,503 head compared to the recorded increase of 198,325 cattle—underlines the previous expressed anxiety regarding a quick build-up of over stocking in the lowveld Tribal Trust Lands.

The percentage take-off for each district is given to reiterate the paucity of the sales from the Sinoia, Umtali and Gwelo Districts, stressed in previous reports. Heavy expenditure of staff and finance is entailed in keeping these cattle alive, as many of them are in Trypanosomiasis areas, yet the national economy derives little profit from such efforts.

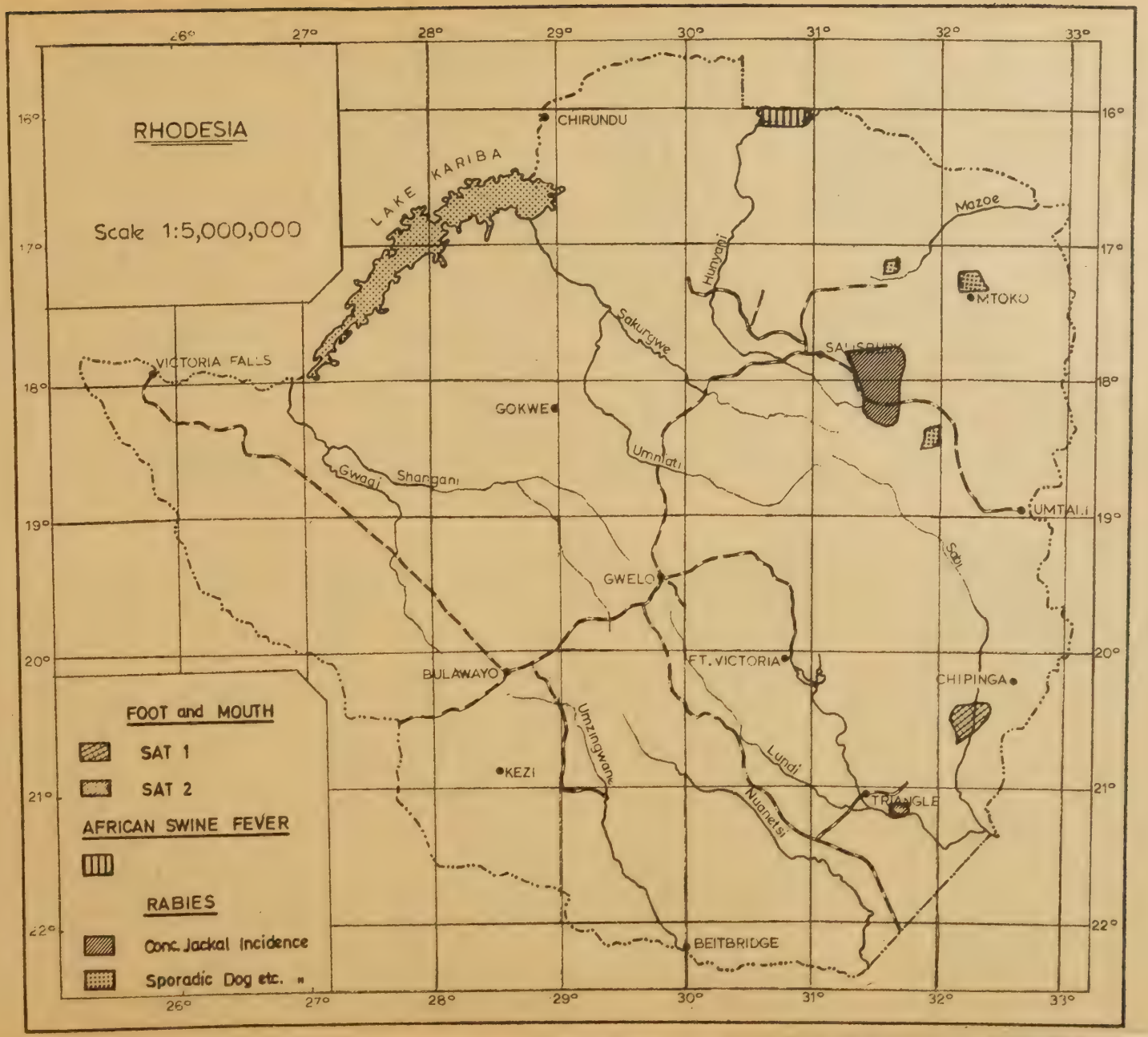
District	Total African Cattle	Sold	Percentage 1966–67	Percnetage 1965–66
Salisbury . .	470,499	7,657	1·63	1·05
Bulawayo . .	400,597	15,330	3·83	6·82
Gwelo . .	390,522	6,926	1·75	1·87
Umtali . .	296,236	4,477	1·67	0·77
Fort Victoria .	506,236	17,978	2·49	5·36
Gwanda . .	138,770	10,798	8·32	12·71
Sinoia . . .	67,267	438	0·19	0·05
Chipinga . .	67,398	3,908	3·16	4·80
TOTALS . .	2,337,525	67,512	2·88	4·42

DISEASE FACTORS

Foot and Mouth Disease

(a) *Devuli Ranch.*

The year opened with Devuli Ranch still under restrictions with all cattle having been virused in


RHODESIA
Scale 1:5,000,000
26°
27°
28°
29°
30°
31°
32°
33°
16°
17°
18°
19°
20°
21°
22°
CHIRUNDU
LAKE KARIBA
Hunyani
Mazoe
M.TOKO
Sakurgwe
SALISBURY
VICTORIA FALLS
GOKWE
Umniati
Gwagi
Shangani
UMTALI
Sabi
GWELO
FT. VICTORIA
BULAWAYO
CHIPINGA
Umzingwane
Lundi
KEZI
Nuanetsi
TRIANGLE
BEITBRIDGE
FOOT and MOUTH
SAT 1
SAT 2
AFRICAN SWINE FEVER
RABIES
Conc. Jackal Incidence
Sporadic Dog etc. "

mid-September, 1966. This terminated active disease on this ranch and no spreads occurred to the contiguous properties thereafter.

(b) *Angus Ranch.*

Fresh infection, S.A.T. 1 type—as confirmed on Devuli—suddenly appeared on Angus in mid-December, 1966. Reports of buffalo having left the Devuli Ranch and then having re-appeared at the pools in the Mkwasine River on Angus Ranch during November strongly indicated the possible source of infection. All cattle and small stock on this ranch plus the stock on the adjoining Matudza Tribal Trust Land, who shared the common watering on the Mkwasine with the Angus stock, were concentrated within cordons and virused on 28th-30th December, 1966, i.e.:

Cattle	4,978
Sheep and Goats	1,451
Total	6,429

Reactions were satisfactory but mild and end point of disease occurred by mid-January, 1967.

A total of 968 head of cattle belonging to the proprietors of Angus and Devuli had been isolated midway between both ranches on a small detached section of winter grazing and had escaped infection. As these would later return to Devuli it was decided to remove them to Devuli in January and virus them so that all cattle on the two properties would have an established immunity following natural infection.

No further spreads occurred from Angus and the cordon was lifted at the end of February, 1967.

(c) *Hippo Valley Estates*

An isolated outbreak was confirmed on 18th August, 1967, in cattle and sheep isolated in a block of paddocks. The affected stock was cordoned off in three of the paddocks with cattle-free areas surrounding them and successfully virused. Typing showed this to be SAT 2 and the remaining sheep and goats on the property were vaccinated with SAT 2 Vaccine between 5th to 7th September, 1967.

Virused 1,104 Cattle	Vaccinated 1,975 Sheep
423 Sheep	190 Goats

This centre was successfully contained with no spreads.

This centre demonstrated the ease with which an outbreak can be controlled on an estate which is efficiently subdivided into separate agricultural and livestock sections with sound fencing and planned isolation of stock units. The efficacy of fully fenced irrigation canals in the limitation of movement of free living wild life was also amply proven on this property.

Rabies

Total confirmed cases were 165 compared to the record high of 224 in 1965-66, the massive infection having died out in the jackal population by May, 1967.

Positive Cases

	1966–67	1965–66
Jackals	76	120
Dogs	61	79
Bovines	16	14
Duikers	—	2
Meercat	3	1
Horse	—	1
Cat	3	1
Pig	—	1
Aardwolf	—	1
Skunk	—	2
Ratel	1	1
Human	5	1
TOTALS	165	224

We are indebted to the Vermin Units of the Department of Wild Life Management for the speedy reduction of the jackal population in districts east of Salisbury before the infection became firmly established. Useful instruction to farming communities in poisoning techniques was also given. Of the total positive cases, 94 occurred in the Salisbury Province, viz. 72 jackals, 14 bovines, six dogs, one mongoose, one ratel. The low incidence in dogs reflected the high level of vaccination maintained in the canines of the area. The 14 bovines recorded in the jackal infected area all demonstrated one pathogenic symptom not extensively recorded hitherto in rabies in the absence of any reflex anal control in the live animal and a complete relaxation of the anal sphincter after death.

With the introduction of compulsory re-vaccination of dogs at three years of age in addition to the previously required inoculation at three months and twelve months of age, the total of vaccinations rose to a record of 263,040 dogs.

Bovines in the Salisbury Province were vaccinated by private practitioners in view of the jackal threat.

Diagnosis

The adoption of Fluorescent Antibody Diagnosis in parallel with the established histological and biological techniques has materially

aided the essential rapid diagnosis required in cases of human involvement. To date we have secured a 14 per cent. increase in the efficiency of immediate diagnosis, the F.A. technique giving 91 per cent positives, failing to diagnose a nine per cent. that proved positive to the biological test, in comparison to histological diagnosis of 77 per cent. positives with failure to diagnose in 23 per cent. that proved positive biologically.

F.A. technique only failed to diagnose one per cent. of the cases confirmed by histological and biological technique as positive.

African Swine Fever. In July, 1967, 74 pigs died in the Mukumbura area, Chiswiti T.T.L. on our north-east border adjoining Moçambique and African Swine Fever was confirmed in the Laboratory. Deaths had been occurring in pigs in the adjoining area of Moçambique and infection was transmitted by the usual hawking of pigs killed to avoid mortality therein. A road block with the customary search of vehicles, bicycles and pedestrians for meat stopped any spread further into the country. An immediate standstill order with confinement of all pigs and inspection at two-day intervals soon revealed the spread of infection to the west of the initial infection, no infection being found in the guard area created to the east. All pigs in the first infected area, 139, had been slaughtered and burned immediately but it was decided to clear the whole area to the west once secondary infection was found with slaughter and burning of all pigs. In the whole exercise, 771 pigs were slaughtered with a compensation paid of £767 5s.

This is the second time infection has invaded this area from Moçambique in the last seven years. Unfortunately, the local Africans depend greatly on pigs for protein supplies and it is impracticable to enforce a compulsory confinement of pigs to sties as no crops are available to feed them.

The last death was on 18th August, 1967 and no further infection has been found despite sustained intensive inspections of the Tribal Trust Lands.

Theileriosis: The rigid application of weekly dipping in old Theileriosis centres throughout the year to abort any flush of brown ticks is now showing dividends especially in the Sinoia District where Theileriosis has been a hardy annual for the past two decades, yet in 1966-67 not one outbreak occurred.

A general country-wide improvement has been effected as recorded hereunder:

District	1964–65		1965–66		1966–67	
	Out-breaks	Deaths	Out-breaks	Deaths	Out-breaks	Deaths
Bulawayo .	3	7	3	7	3	3
Salisbury .	4	17	12	42	5	13
Victoria . .	1	13	1	103	1	5
Gwelo . .	—	—	1	7	1	8
Umtali . .	4	32	5	76	6	17
Sinoia . .	11	65	10	36	—	—
TOTALS .	23	134	32	271	16	46

In one recurrent centre in Umtali Province, where a particularly virulent strain had persisted over the years, and dipping facilities were such as to preclude its elimination thereby, the remaining herd was slaughtered, with compensation, conditional on the farms subsequently remaining free of stock for 18 months.

Tuberculosis

Bovine

Imports tested (double comparative) 333—Reactors nil
Exports tested (double comparative) 1,275—Reactors nil

Meat Inspection Incidence

Total cattle slaughtered	—	288,677
Partial condemnation	—	3
Total condemnation	—	1

Dairy Herds—Attested Scheme

Comprised 374 herds with 33,483 cattle, the majority being on Attested status; these are the main urban milk suppliers.

Only 54 herds totalling 7,135 cattle were tested this year and yielded a total of three reactors, emanating from two premises. One reactor showed no visible lesions. Percentage reaction was 0.04 per cent. cf. 0.039 in 1965-66, 0.05 per cent. in 1964-65.

As there is no financial incentive for the production of T.B. free milk or stock, little enthusiasm exists for this scheme and it is extremely difficult to justify its continuance in the face of a staff shortage unless an eradication programme with full compensation was approved and accepted.

Anthrax

Diagnosed in three centres, two in Salisbury Province, involving old centres, and one in Bulawayo Province, giving a mortality of 12 cattle. Speedy control was effected by vaccination, a

total of 152,822 cattle and 29,847 small stock being treated.

Brucellosis

A national survey is being quietly pursued whenever staff is available.

Statistics (1966–67 surveys)

(a) *General Field Sampling*

Samples	*Total*	*Positive*	*%*	*Doubtful*	*%*
Blood sera	8,379	872	10·4	474	4·6
Tampons	1,310	38	2·9	—	—
Foetus	86	23	26·7	—	—
TOTALS	9,775	933	9·5	474	4·6

(b) *Milk Ring Tests—Dairy Marketing Board Centres*

Area	*Total Herds Supplying*	*No. of Herds Tested*	*Positive*	*%*	*Doubtful*	*%*
Salisbury	206 (*a*)	200	22	11	6	3
Gatooma	30 (*a*)	28	16	57·1	1	3·6
Gwelo	82 (*b*)	82	15	18·3	4	4·9
Umtali	34 (*c*)	34	2	5·9	—	—
Bulawayo	110 (*a*)	27	5	18·2	—	—

(*a*) Church samples; (*b*) Herd samples; (*c*) 500 lb. lots sampled.

Note.—Bulawayo centre still to be completed.

At the present, the over-all dairy herd incidence is approximately 26 per cent.

(c) *Slaughter Stock Blood Sera Tests: C.S.C. Abattoirs*

	No.	*Positive*	*%*	*Doubtful*	*%*
Cows	1,097	28	2·5	17	1·5
Steers	155	—	—	5	3·2
Sheep	111	1	0·9	6	5·4
Goats	96	—	—	—	—
Pigs	86	—	—	12	13·9

(d) *African Tribal Trust Lands (Communal Grazing)*

No. of Tribal Trust Lands	*No. of Dips Sampled*	*No. of Samples*	*Positive*	*%*	*Doubtful*	*%*
5	17	1,445	95	6·5	26	1·1

(e) *African Purchase Areas (Farm Owners) Blood Sera Tests*

No. of Farms Tested	*No. of Cows Sampled*	*Positive*	*%*	*Doubtful*	*%*
244	681	9	1·3	14	2·05

(f) *Uterine Mucosa Test (Stained Antigen) C.S.C. Abattoir, Salisbury*

Four hundred and fifty-eight tests were done of utefine mucosa and compared to blood sera tests of the same animal.

Uterine tests—5 positive—1·09 per cent.

Sera tests—11 positive—2·4 per cent.

(g) *Positives—Back Checking*

Wherever possible a positive MRT or other survey test was followed by a blood test of the suspected herd.

Herds Tested	*No. of Samples*	*Positive*	*%*	*Doubtful*	*%*
14	1,096	102	9·3	32	3

(h) *Tests of Human Sera—C.S.C. Abattoir—Slaughter Floor*

No. of Samples	*Positive*	*%*	*Doubtful*	*%*
29	3	10·3	1	3·4

Other Stock

Nine rams on three premises were confirmed as positive *(Br. ovis)*. One virgin ewe goat was found to be infected with *Br. suis* (Type 1)—the first time *Br. suis* or Brucellosis in the goat had been confirmed in Rhodesia.

Vibriosis

With the wider adoption of pregnancy diagnosis in Ranch Herds to ensure early culling of barren cows and greater interest in infertility, ranchers are realizing that they have been living with Vibriosis unrecognized in many of the Mashonaland herds and corrective measures are now being demanded. Artificial insemination is not a practical proposition, as yet, in ranch herds and few properties are well enough controlled to run separate heifer herds, etc. Tri-valent bacterias are now under trial as a control measure; these are unfortunately costly and the question of their effectivity against the local strains of Vibrio foetus will take time to assess.

Tick-borne diseases

Deaths from common tick-borne diseases have mounted in incidence; whether this arises from a keener interest in mortality arising from the price increase in cattle or from the lack of premunity to local strains in the drought evacuation cattle remains to be seen.

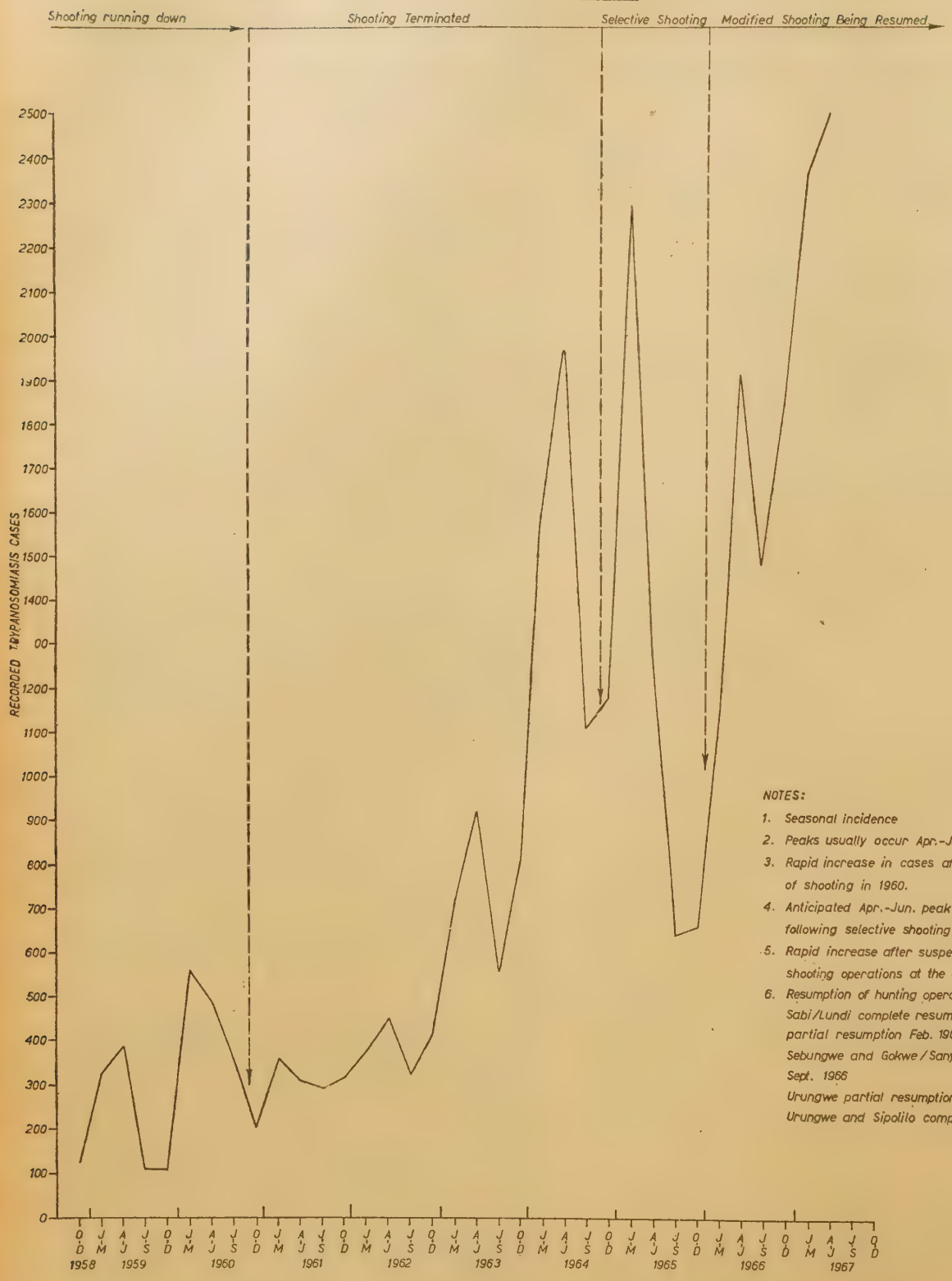
General

No other major losses occurred in stock but the rising incidence of mortalities from Schistosomiasis in both sheep and cattle presented a new problem.

Schistosomiasis has always been present (C.S.C. surveys 1959, showed 69 per cent. of cattle affected) but has never been markedly pathogenic.

It is noticeable that this new epidemiology has largely occurred in areas where molluscicides were extensively used in snail control for several seasons and then completely abandoned. Deaths are occurring mainly in adult stock which would normally have been infested with Schistosomes at an early age with development of some immunity. With the use of molluscicides no such infestation eventuated and it is this class of stock that now succumb to infestations when they first meet it as adult stock, especially if they are on a low level of nutrition throughout the winter.

FIG.1 : TOTAL TRYPANOSOMIASIS CASES 1958-1967 (QUARTERLY FIGURES)



NOTES:

1. Seasonal incidence
2. Peaks usually occur Apr.-Jun.
3. Rapid increase in cases after termination of shooting in 1960.
4. Anticipated Apr.-Jun. peak of 1965 did not appear, following selective shooting operations.
5. Rapid increase after suspension of selective shooting operations at the end of Oct. 1965
6. Resumption of hunting operations a gradual process:-
   Sabi/Lundi complete resumption and Sebungwe partial resumption Feb. 1966
   Sebungwe and Gokwe/Sanyati complete resumption Sept. 1966
   Urungwe partial resumption March 1967
   Urungwe and Sipolilo complete resumption July 1967

Specific Poultry Diseases

No major outbreaks of disease occurred during the year. The incidence of Fowl Typhoid and particularly Paratyphoid was remarkably low.

The most important diseases were again Leucosis, Coccidiosis and Necrotic Hepatitis ("blackhead").

With Leucosis, the adoption of the all-in all-out system by egg producers could reduce losses from this disease considerably.

In spite of the use of coccidiostats, losses due to Coccidiosis continue to be high. Small scale trials of a live Coccidiosis vaccine have shown promising results and larger field trials are planned for the future.

An outbreak of virulent Newcastle Disease spread to within 12 miles of the Umtali District Border in Moçambique but fortunately did not spread to the Border Tribal Trust Lands. Mortalities of up to 30,000 birds on single properties were reported. Vaccine was immediately made available and owners voluntarily vaccinated over 32,000 birds in the threatened area. No spread of disease into Rhodesia occurred.

A sporadic outbreak of Fowl Cholera in the Sinoia District was eliminated by slaughter with compensation.

Minor disease control has greatly improved generally, more attention is being paid to prophylactic vaccinations, worm-dosing, etc., but in regard to the latter much of its worth is still being debased by failure to move treated herds to clean pastures.

Tsetse and Trypanosomiasis Control

This year witnessed the long predicted extension of Trypanosomiasis into the Wankie District, further encroachment in the Umniati/Umfuli drainage complex and marked increases in the incidence of the disease in the Lutope-Sengwe region of the Gokwe District, in the Urungwe and in the Sipolilo District.

The number of cattle at risk in tsetse fly areas rose from 337,000 to 382,000 head.

The graph of Trypanosomiasis cases 1958-1967 clearly sets out the position and underlines the serious set-back imposed on our selective shooting control operations with the necessitated prohibition and later the modified and tragically slow resumption of these measures. It will take at least two years to regain the lost ground.

In the Wankie area serious incursions of the disease to within seven miles north of Wankie National Park and within nine miles east of Wankie itself were discovered in January-June, 1967. Both cattle and elephant are highly suspect in promoting this advance of tsetse fly.

Immediate counter measures in the shape of development of 350 miles of new access roads, for insecticide spraying, etc., realignment and a 50-mile extension of the South Sebungwe Game Fence, movement of cattle off the Gwaai River and the erection of 80 miles of restricting fences, provision of boreholes by the Ministry of Internal Affairs, extension of selective shooting of game, and an intensive spraying operation of known tsetse infested areas east of the Gwaai River were all put in hand with good progress to date but it is, as yet, too early to comment on the effects of the operations.

The deterioration in the Umniati/Umfuli area led to a wide spread to the east of the Umniati in the Gatooma District. In line with this advance from the north, a similar advance from the north on the west of the Umfuli draining system doubled up the cases occurring in the Gokwe Tribal Trust Land.

An extensive spraying operation was mounted in June, 1967, and is still in progress. Tsetse numbers are already showing a decline and this is being augmented with concentrated selective shooting.

Elsewhere on this front hunting operations have been the sole means of control but it will take time to regain the ground lost since shooting perforce was suspended in November, 1965.

In Gokwe alone to maintain the 36,580 cattle we had to take and examine 25,088 smears and administer 62,623 injections of various chemotherapeutic agents.

In the Urungwe District, the considerable influx of drought evacuation cattle into the Vuti Block and the Karoi European Farming Block in the previous year, which we had vainly tried to stem, brought more cattle to risk and there was a corresponding increase in the incidence of cattle Trypanosomiasis throughout the area. In the Karoi farms, cases increased from 93 in 1965-66 to 270 in 1966-67 involving 36 farms, of which 13 were infected for the first time. The constant

heavy challenge has persisted over the whole Vuti Block and cattle have only been kept alive by continual chemotherapy. A further deterioration occurred in the Urungwe Tribal Trust Land. Hunting operations were only partially resumed in February and in the main area in June, 1967, and efforts to offset this ban in the shape if insecticidal spraying in September-October, 1966, in the north-west in the path of the fly advance and in central Urungwe in August and September, 1967, have not as yet had time enough to show results.

In the Sipolilo District, hunting operations being suspended for 20 months, the expected advance of fly over the escarpment eventuated. Cases rose from 62 in 1965-66 to 667 in 1966-67. These have been mainly in the Tribal Trust Lands in the north with little increase in cases in the European farms to the south despite a large increase in cattle with the diversification policy. A spraying operation was mounted to the south of the escarpment in August, 1967 and is still continuing, supported by the modified shooting operations resumed in July, 1967.

These setbacks have, however, been offset to some extent by a general improvement on other sectors of the extensive tsetse fronts, in particular Lupane, the Angwa drainage, Mtoko-Inyanga, Chipinga and Sabi-Lundi.

Furthermore it is very gratifying to note that the cause of the toxicity and deaths recorded last year with the drug that can justly be described as the last stand in our armoury, namely isometamidium (Samorin) has been satisfactorily elucidated and overcome.

International Fly Control Project, South East Front

The operations were carried to the east deeper into the fly belt in the area lying between the Lundi and Sabi at the foot of the Chihanju Hills escarpment. Part of the area (20 square miles) in which the tsetse habitat could not be clearly established on a fixed basis was treated on a grid spray pattern of parallel grids ¼ mile apart. A total of 320 squares miles was sprayed using 35,550 gallons of 3.1 per cent. Dieldrin, involving six teams in 4,192 machine miles.

Two teams spent periods in the Moçambique area and the overall success of this International operation, an annual event since 1962, seems assured.

The threatening advance of fly to the Nuanetsi ranching area has been definitely averted and the possible swing of fly to the south as a threat of invasion of Kruger Game Park now seems a remote risk.

Works 1966-67 (Trypanosomiasis Branch only)

(a) Game Fences Erected—136 miles. Maintained 854 miles.

(b) Cattle Fences Erected—113 miles. Maintained 535 miles.

(c) Roads and Access Tracks Constructed—603 miles. Maintained 3,950 miles.

(d) Spraying—Hand Spraying with 3.1 per cent. Dieldrin Emulsion or with D.D.T. Wettable Powder—

Total Area sprayed—1,996 square miles.

Total Insecticide used—28,550 gallons Dieldrin Emulsion, 20,000 lbs. D.D.T. Wettable Powder.

Total Insecticide Cost—£59,566.

Cost of Spraying—The total spraying campaign had not been completed by 30th September and these will be shown in next year's report.

A vast amount of endless toil and seeking of control alternatives has developed upon this Branch this year and it is only due to the tireless devotion of certain individuals that a gross deterioration has been averted. We can have hopes of recovering the situation provided selective shooting can be gradually re-instated to its previous peak but the next two years can be anxious ones in regard to Trypanosomiasis in cattle in fringe areas until we make up the lost leeway. This year 130,533 blood smears were examined revealing 8,134 positives (6.2 per cent.) but by the skilful manipulation of drug therapy deaths were reduced to a complete minimum without the emergence of any drug resistance by the causal trypanosomes. As stated previously we live on a knife edge balance in maintaining cattle in fly belts under drug therapy and the only permanent solution and promise of expansion lies in the effective elimination of the tsetse fly.

During the year the service of analysis of blood meals of tsetse fly, heretofore performed in England, ceased with the transfer of the responsible scientist and from January we have had to mount our own blood-meal analysis. A special laboratory is being built and specific high titre anti-sera

production in rabbits from 10 species of free-living wild life has already been achieved.

Investigations on tsetsicides as residual insecticides on vegetation and external and internal administration to cattle are being pursued.

Tsetse behaviour and physiology is being relentlessly studied in search of any addition to our armoury and the two field research stations, Lusulu and Rekomitjie, are being increased in staff and scope.

In view of the peculiar reversal of past field experience noted in the west where the presence of fly was established before actual cases of Trypanosomiasis were diagnosed — in the past cases were always seen for long periods before fly could actually be picked up—research into the effect of maintained chemo sterilants in cattle on the infection rates and the transmission of trypanosomes in *G. morsitans* were instituted. Further immunological studies and long-term drug trials continue.

Game/tsetse relationship studies on Redcliff Island have been disappointing and the work is being re-located on two other islands in Kariba more suited to the purpose.

In the Sengwa Research Area, the major importance of wart hog as a food source to *G. morsitans* has been clearly established and is under further study.

The permanence of the results obtained from the Nagupande selective shooting experiment of 1962 still persists in the Lupane area with a virtual cessation of cases and sustained absence of fly.

MEAT INSPECTION

Abattoir Hygiene

Major shortcomings have been overcome in all abattoirs with re-arrangement of internal lay-out to bring the premises up to the standards of the German requirements in approved export abattoirs, the which will doubtless be the pattern adopted as Common Market regulations for officially registered export abattoirs.

Our abattoirs will, in the near future, be outstanding in their class and the pre-planning of the Gatooma Abattoir indicates that we will soon be leaders in this field.

The registration of our export abattoirs by Germany and France reflects the high-class reports that have been taken back concerning them by visiting members of the trade.

Acknowledgement must be made of the immediate response of the management and engineers of the Cold Storage Commission to any request for improvement made to them and the increasing co-operation and interest in matters affecting meat inspection and hygiene in general greatly enhances our effectivity and control in the abattoirs.

The free provision of premises for a demonstration room, laboratories and offices at Bulawayo Cold Storage Commission abattoirs for the Meat Inspector's Training Centre must also be gratefully recorded.

Slaughterings

Cattle and Calves	*Sheep*	*Goats*	*Pigs*
288,677	33,547	2,658	115,585

Sheep and goat shortages were most acute at Bulawayo Cold Storage Commission and reflected not only a dearth of imports from Botswana but also the preference of the African dealers to consign such to the Municipal abattoirs.

Pig slaughterings continue to show a steady increase notably in Matabeleland where not only quantity but quality of the animal has increased.

The question of local butchers being given service facilities at the Cold Storage Commission export abattoirs is one that will have to be faced in the near future. This service is one that often sorely prejudices the efforts being made to maintain a high standard of hygiene in all sections and should be banned in export abattoirs.

Total Condemnations

Cattle and Calves	1,757	—	0.6%
Sheep	201	—	0.59%
Goats	27	—	1.01%
Pigs	1,010	—	0.87%

Condemnation Causes—Total Carcases

		% *Condemnations*
(a) *Cattle*		
Cysticercosis	626	35.1%
Emaciation and Oedema	269	15.3%
Sarcocysts	246	14.1%
Pleurisy and Peritonitis	150	8.8%
Trauma	68	3.9%
Pyaemia	60	3.4%
Icteris	27	1.5%
Multiple other causes	311	17.8%
Total	1,757	
(b) *Sheep and Goats*		
Emaciation and Oedema	178	
Pyaemia	21	

The good rains of the last season favoured the maintenance of condition in cattle on free range but had the opposite effect on sheep due to rank grass growth and increased worm burdens, especially in Matabeleland, where worm dosing of sheep was minimal.

A very satisfactory state of affairs appertains generally in respect of the two major food-species in that general condemnation of carcases is gradually decreasing annually with better animal husbandry, it being necessary to condemn only one out of 164 beef carcases and one out of 127 pigs in 1966-67.

Specific Condemnations

(1) *Beef Measles*

Cattle slaughtered	*Condemned*	*Detained*	*Total % incidence*
288,677	626	3,093	1.43

There are certain areas of the country in which the percentage of measles is alarming, e.g. 15.33 per cent. from Que Que area. A long term eradication programme has been put forward to the main centre concerned, the Sessombi Intensive Conservation Area, and they seem determined to take all practical steps to fight this menace.

(2) *Pork Measles*

Pigs Slaughtered	*Carcases Condemned*	*%*
115,585	670	0.58

Mostly African pigs on free range but is decreasing as owners learn to house pigs in sties or deep litter houses.

(3) *Sarcocysts* (Eosinophilic Myositis)

Limited investigations of this enigmatic condition have failed to reveal the presence of sarcospordia in any bovine lesion but on several occasions the parasite was detected in smears from fresh pig lesions where the absence of any eosinophilic infiltration was notable. Macroscopic cysts in sheep are, so far, unknown in Rhodesia.

(4) *Hydatidosis*

Cattle were the only infested species and the following organs were found to be affected:—

Lungs	*Liver*	*Cattle affected*
3,618	151	3,769
96%	4%	

Total Kill incidence—1.3%

The total percentage incidence is increasing *viz.*,
1964-65—0.92% 1965-66—1.00% 1966-67—1.3%

This rise is disturbing. Due to its public health significance in that 98 per cent. of these cysts are fertile in cattle it is requisite that some effort should be made to control hydatidosis. Infestation may rise from other sources than the domestic dog, e.g. black-backed jackal, but undoubtedly most arises from regular contact with dogs especially in kraaled cattle, i.e. mostly in the Tribal Trust Lands. The development of co-operative societies to graze communal herds in fenced paddocks and to obviate kraaling in such areas would be a highly effective step towards a decrease.

The increase in African butcheries also suggests that a keener control of offal disposal with the prohibition of the feeding of raw offals to dogs is overdue.

Traumatism

Condemnations from bruising have considerably fallen and represent only one complete carcase in 4,245 in cattle, one in 11,182 in sheep and one in 12,483 in pigs. Weighable bruise trimmings from beef carcases, not completely condemned, totalled 19,639 lbs.

Liver Fluke

Incidence necessitating total condemnations or substantial trimming was 59,470 livers, i.e. 18.65 per cent. At a conservative estimate, this represents a loss of over 200 tons of ox liver per annum, the which is avoidable if farmers would only adopt routine dosing prodecures.

Stilesia infection in livers

Thirty-two thousand and seventy-nine (88.4 per cent.) of sheep livers were condemned. The advent of an effective remedy for Stilesia in 1966 should materially reduce this gross loss in the near future.

Research Branch

As already stated, the cancellation of the erection of the new laboratories has had adverse effects on the morale of this section, and it will be difficult to retain staff.

The creation of a bio-chemistry unit has greatly facilitated the solution of dietetic problems, etc.

Routine Services

The increasing call on this Branch is reflected in a record throughout of 32,036 post mortems and examinations of submitted materials.

In the rabies section, 521 specimens were dealt with and diagnosis has materially improved with the adoption of the Fluorescent Antibody technique.

Two thousand seven hundred and eight tampons were tested in investigation of infertility in cattle herds.

Two thousand five hundred and forty-one check specimens from Cold Storage Commission were processed, including "sausage" media incubation in bacteriological contamination tests as to hygiene, etc.

Checks of gall bladders and rumenal fluids of healthy cattle slaughtered at the Cold Storage Commission abattoirs for the presence of Salmonella were effected. Of 700 gall bladders, only three to date have revealed Salmonella, *viz.*, *S. enteritidis*, *S. newport* and *S. bareilly*. No Salmonella was found in 365 specimens of rumenal contents similarly sampled.

Despite over 2,500 trichinoscope examinations having proved negative, in view of the demonstration of trichina in free-living carnivores in the Republic of South Africa, feeding tests of ferrets with pig diaphragms to completely substantiate our previous negative findings were instituted. Two thousand and five diaphragms have been fed to date with negative results.

In view of the increase of Fascioliasis in certain game parks (*F. gigantica*) and lack of demonstration of the intermediate host (*L. natalensis* has been negatived) a search for a suitable laboratory animal susceptible to this parasite was pursued. To date only *Aethomys chrysophilus* and *Cricetomys gambiensis* have proved susceptible.

Heartwater

The investigation of the possible role wild rodents play as reservoir hosts is being actively pursued.

In the poultry section, 11,941 sera were tested in a P.P.L.O. survey and 3,374 birds were post-mortemed.

Schistosomiasis

Controlled dosing trials of drugs are in course to find an effective remedy.

So far, Lucanthone and Stibophen look promising.

Oestris ovis (Nasal bot)

In view of the expanding sheep industry, a survey of this pest, still in progress, has demonstrated a very high incidence. It was noted to date that the only clean flocks are those kraaled with chickens, a very old Boer prophylactic practice.

An area survey is now in hand.

The Pathology Section dealt with 379 specimens involving the preparation of 1,285 blocks.

Preventive and Curative Services

One million, three hundred and eighty-eight thousand, one hundred and sixty-seven doses of vaccine were issued. The increase was mostly in Bluetongue and Quarter Evil vaccine in line with the expansion in sheep and cattle.

Wild Life Research

A further small research unit has been created on Buffalo Ranch, Chiredzi, to ensure tamed antelopes available for research in a Foot and Mouth prone area.

Artificial Insemination Service

The supply of semen in the Midlands and Matabeleland had to be resumed in view of the failure of one firm to maintain an A.I. Service in these areas. Fortunately we had not to supply inseminators (193 farmers were trained as Inseminators in 1966-67 by a private firm) and we only had to supply semen of which 1,579 ampoules were issued.

Red Water Vaccine

In view of the time limitation of fresh blood vaccine, experimentation with the supply of this vaccine as a deep-freeze product is now in progress.

Biochemistry Section

One thousand, two hundred and nine investigations were undertaken in regard to field problems and even private practitioners are now using this expanding unit.

Cattle Production in African Areas

The study of African extension work by Dr. Chavunduka continues but it is evident that the co-operation offered to him initially is gradually falling off. Unless some immediate apparent benefit is on offer, then enthusiasm soon evaporates. The production of selected easily recognizable animals for weighing and checking on a quarterly basis on routine dipping days has been completely unreliable, e.g.:

Dosing Trials	*1st Weighing*	*2nd Weighing*	*3rd Weighing*	*4th Weighing*
Animals produced	140	97	67	60

This production also reflects the number of animals that are not being produced for dipping.

In one Tribal Trust Land surveyed, the total calving percentage was only 30.5 per cent. despite a bull power of 7.3 per cent. Of these calves only 92 per cent. were added as an increase as yearlings, 8 per cent. having died; 85 per cent. of deaths were from Sweating Sickness, arising from uncontrolled ticks. It is obvious that the creation of a specialized Veterinary Extension Service in the African areas would more than pay for itself in the gain in cattle numbers alone.

Acknowledgements

An extremely trying year has been faced by all staff with enthusiasm, cheerfulness and a surprising devotion to duty, for which I must express deep gratitude.

Thanks are also expressed to the many other Government Departments who have so willingly assisted us with their active co-operation.

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